. 1819
l. XLIV

FLIGHT

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and The AIRCRAFT ENGINEER

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NOVEMBER 4th, 1943

SQUADRON FLEW BACK TO SAVE ITS CHIEF

SQUADRON-LEADER JACK CHARLES, the D.F.C. fighter pilot who recently shot down the 1,000th enemy plane for Biggin Hill station, has since been rescued from the sea by brother officers. He had been on a sortie over Holland. When the squadron returned to base and heard he was missing they refuelled, re-armed and set out to search for him across the North Sea.

Base signalled

They found him, writes the Sunday Express Air Reporter, in his dinghy, 20 miles off the Dutch coast. One pilot signalled base, which immediately reported his position to the R.A.F. Air-Sea Rescue Service.

Spitfires flew round him in protective circles, while others fought off enemy fighters, shooting down two.

Soon Squadron-Leader Charles, with one of the Luftwaffe pilots, was picked up by a high-speed launch and rushed back to England, escorted all the way by the rest of his squadron.

They landed at base with petrol tanks almost dry.

From the Sunday Express, August 8.

The development and construction of the R.A.F. High Speed Rescue Launches is another of the achievements of

THE BRITISH POWER BOAT COMPANY LTD.

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FLIGHT
and
The AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

Supplying Troops by Air

THE episode of Brigadier Wingate's force in Burma will go down to history as one of the most romantic feats of the war. The actual novelty was not so much the penetration of the Japanese lines in the jungle but the supplying of the force by aircraft. This reads something like a fairy tale, though the success of the experiment was certainly due to good organisation rather than to any magic.

An even more striking example of how transport aircraft can move considerable bodies of troops and then keep them supplied for about two months has recently come from New Guinea. The incident occurred in the early days of September when the Australians and Americans were closing in on the important base of Lae. First of all the Australian 9th Division was put ashore from ships, and next day American parachutists seized the neighbouring airfield of Nazdab. Two days later units of the Australian 7th Division, including the Divisional Headquarters, were flown over and landed at Nazdab.

After the capture of Lae this division was again transported in Douglas machines and landed in open country near the Japanese positions at Kaiapit, 44 miles away. The Japanese were taken by surprise and defeated. Then for nearly two months the Australians were kept supplied entirely by air.

The troops thus transported did not amount to a full division, and they cannot have taken heavy guns with them. The movement was only possible because of the terrain in New Guinea, which mainly consists of hilly jungle, and in that way has much in common with Burma. It may yet be a long time before a complete division equipped for European warfare is able to move by air, and to be kept in all necessary supplies by the same means. Nevertheless, the incident is very suggestive. Design never stands still, and larger and larger aircraft are being produced. Who can say that heavy guns will never be moved by air?

The crux, of course, is protection. Long-range escort fighters must be less than a match for short-range interceptors, and one is driven to wonder whether the heavy machines will ever be able to defend themselves against all existing types of fighters. But design in fighters likewise does not stand still, and new forms of attack are always countered in time by new weapons of defence.

Escort Fighters

FIGHTER protection for bombers is a subject which is occupying many minds just now. The increasing range of raids on Germany from bases in Great Britain, and the somewhat heavy losses sustained, inevitably turns attention towards means for defending the bombers, over and above the defensive armament carried by the bombers themselves.

In our Correspondence page this week we publish a letter from a reader who is, apparently, under the impression that his suggestion is novel. It is that some of the large four-engined bombers should be converted into fighters by omitting their bomb load, fitting 20 mm. cannons instead (he uses the expression "bristling with 20 mm. cannons"), and carrying "a formidable weight of ammunition."

There is, of course, nothing new in this suggestion. In *Flight* of January 11th, 1940, we published an article on Escort Fighters by Mr. H. F. King. In that article a number of different "possibles" were examined, including one multi-turret type which, Mr. King pointed out, could be a direct modification of a standard long-range bomber. Quite a lengthy correspondence followed the publication of Mr. King's article.

By a curious coincidence, a day or two after we

received the letter from "Perspex" published on page 514 of this issue, an article reached us in which the author suggests going still farther—to the "aerial battleship," in fact. We hope to publish that next week.

In the meantime it might be pointed out that the advocates of bombers converted into fighters with very powerful offensive armament appear to forget that although superficially the fact that no bombs were carried should permit the carrying of large supplies of ammunition, there is the question of the drag caused by guns and turrets. If bombers were to be cleared of gun turrets, using their entire carrying capacity for fuel and bombs, they could be "cleaned up" considerably. On the other hand, the escort fighters would of necessity have a number of gun turrets, assuming them to be merely bombers converted into escort fighters, and their speed would inevitably suffer.

The Function of Carriers

ON another page of this issue there appears a review of the Admiralty brochure describing the work of the Fleet Air Arm in this war. On page 16 the general principle is laid down that: "The carriers' proper function is to operate with ships at sea beyond the range of enemy airfields." The writer goes on to explain that the exigencies of war have frequently compelled carriers to be used in narrow seas.

It appears, however, from the happenings to date that the chief danger to carriers when near land comes from submarines rather than from enemy aircraft. Of the five British carriers lost only H.M.S. *Hermes* has fallen to air attack, having been sunk by Japanese aircraft off the coast of Ceylon. H.M.S. *Glorious* was shelled by two German capital ships (probably the *Scharnhorst* and *Gneisenau*) off the coast of Norway. H.M.S. *Courageous*, *Ark Royal* and *Eagle* fell to submarine torpedoes, the latter two in the Mediterranean. Details about the losses of American and Japanese carriers in the Pacific are not yet known to us.

It appears probable, however, that carriers will have to regard the provision of fighter cover for amphibious operations as part of their normal duties, and that means running the risk of lying within range of shore-based enemy aircraft. That means also providing cover for all the ships as well as for the troops on the beaches; in fact, it means using a large number of carriers. Numbers can most easily be provided by using small escort carriers, but their limitations call for a high degree of skill from the pilots of fast-landing fighter machines.

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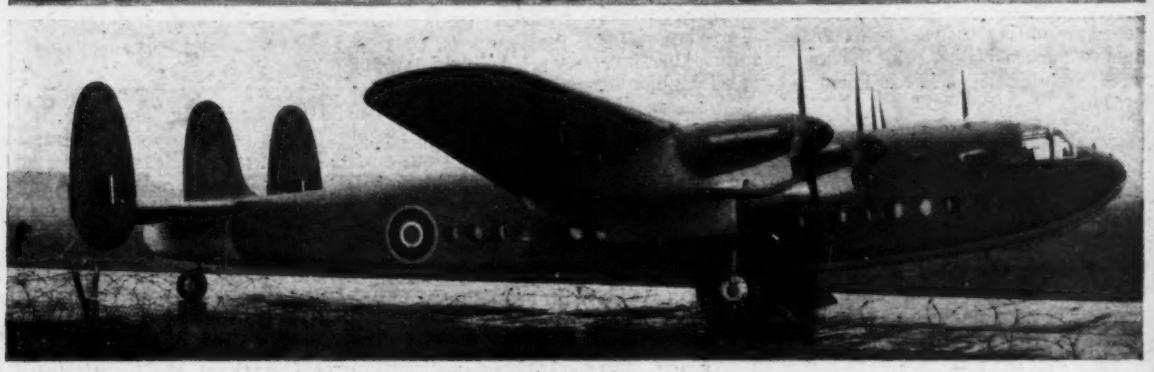
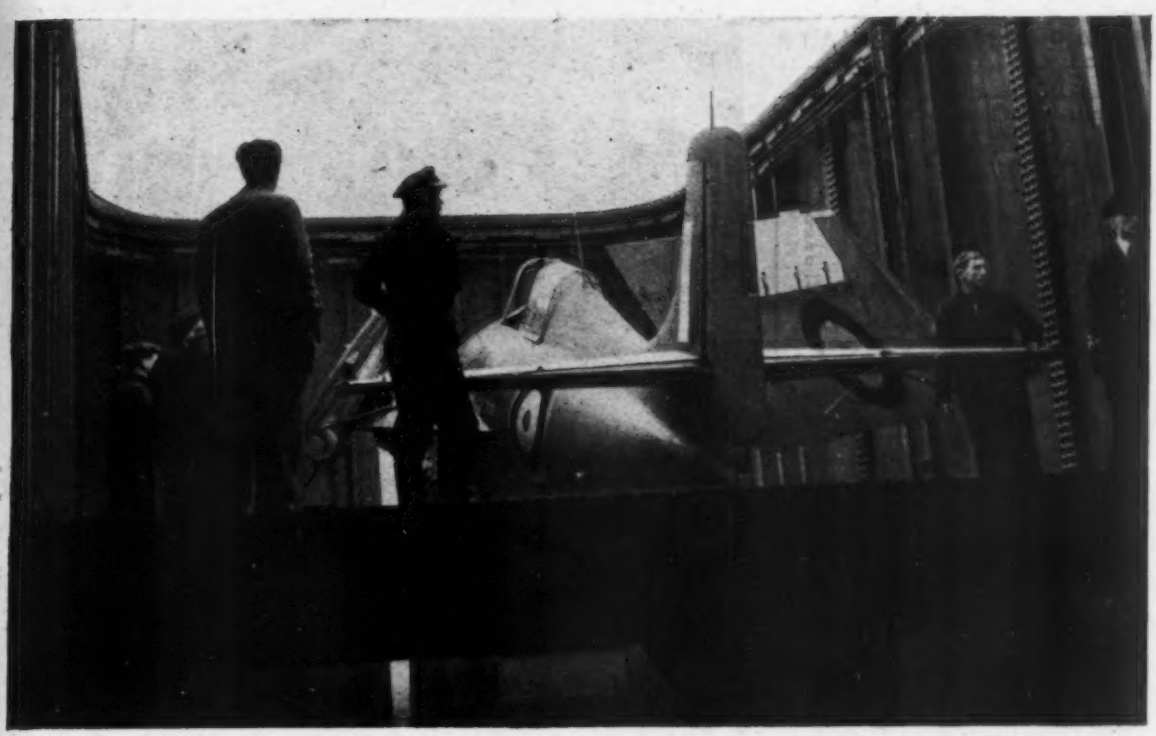
AVRO YORK TRANSPORT—PULLMAN OF THE AIR



Although the Avro York has been developed from the Lancaster bomber, it is virtually a different aircraft. The wings and engine installation are the same, but the fuselage is of different dimensions and has flat sides. For relatively short ranges the York can carry more than 50 passengers or large quantities of bulky freight, the fuselage being of generous proportions. Noteworthy is the fact that the flat-sided fuselage appears to have rendered a third fin necessary.



DIRECT LIFT : A Grumman Martlet being taken from the hangar deck to the flight deck of H.M.S. *Illustrious*.

WAR in the AIR

Luftwaffe's Desperate Attempts to Stem Russian Advance : General MacArthur Strikes Again : Bombing the Dodecanese

THE massive Russian advance has provoked some daily papers in this country to publish headlines alleging that the German retreat has become a rout. Sober reports from the Eastern Front do not support this wishful thinking. The Germans are being driven back, fighting hard, and very unwilling to relinquish their gains of past years. It is certainly not a retreat "according to plan," if the word "plan" means what the German High Command would like to do, but so far it has been an orderly and well-conducted retirement and anything but a rout. Nevertheless, the German front in the south has been decisively broken, and the Russians have been pressing hard on the retreating enemy.

The question, at the time of writing, is whether the Germans have not delayed the withdrawal of their forces too long. There seems to be a distinct danger that those forces in the Crimea, for example, may be cut off by the Russian seizure of the only possible lines of retreat. Consequently the resistance of the enemy is most determined at important railway junctions and other crucial points. Round Krivoi Rog (which may have fallen to the Russians by the time these words are published) the enemy tried to hold up the advance of our Allies by a liberal use of the *Luftwaffe*. Groups of German bombers, often numbering from 50 to 70 machines, have tried to stem the advance of the Red Army in that sector, and they extended their

BRISTOLS IN THE ANTIPODES : An R.A.A.F. Beaufort taxying from its dispersal point at an air base in Northern Australia.

WAR IN THE AIR

ENEMY AIR LOSSES TO OCT. 30th

	Over G.B.	Continent	Middle East	N.W. Africa
Oct. 24	0	10	0	15
,, 25	0	0	2	0
,, 26	0	0	1	0
,, 27	0	0	1	0
,, 28	0	0	0	2
,, 29	0	0	0	6
,, 30	2	0	6	0
	2	10	10	23

Totals: West, 7,672; Middle East, over 5,740; North-West Africa, 3,494.

efforts as far back as the crossings of the river Dnieper.

At the same time efforts were made to ease the strain on the railways by flying up supplies of fuel in transport aircraft. The Russians took heavy toll of these machines.

Far away in the islands of the Pacific the Japanese tried to build up once more their air base at Rabaul, which was lately devastated by the aircraft of Gen. MacArthur. It hardly seems to have been a sensible move, unless the Japanese commanders saw more than an off chance of rapidly gaining air superiority. As things went, they only sent more sheep to the slaughter, for the Allies struck again, once more throwing in pretty well every available bomber. As in the first attack, the destruction of enemy aircraft, mainly on the ground, was very heavy, while the Allied losses were extremely light. Gen. MacArthur declared that this second series of raids "crippled the enemy's air reinforcements, which he was attempting to build up from rear areas."

In New Guinea it has now been disclosed that Australian troops in formidable strength were recently flown up to the front in American transport aircraft and so expedited the capture of Lae.

An Unfortunate Incident

THE Middle East Headquarters issued a communiqué on October 26th which said: "In Cos our remaining land patrols, having completed their task, have been successfully withdrawn." One resents the wording, for the land troops, said to have originally numbered only 1,000 men, had been outnumbered by a German landing supported by a superior force of aircraft, and had been driven into the hills. What happened to the Spitfire squadron which first landed on the island has not been made public, but for some time before the evacuation of the remaining ground troops the Middle East had been bombing the airfield there, Antimachia, and the German shipping in the harbour. Mistakes will occur even in a campaign which is generally successful, and official communiqués are not expected to cry "Peccavi," but the phrase "having completed their task" was not happily chosen and will deceive nobody.

RUINING THE RUNWAYS: Fortresses of the N.W.A.A.F. pattern-bomb the Sedes airfield near Salonika.

Mosquito Night-fighters

IT has recently been announced that the Mosquito is now being used as a night-fighter. That remarkable machine seems to be as versatile as the Hurricane. Of late the raids of the *Luftwaffe* on Britain have been characterised by speed rather than by weight. Heavy attacks like those of 1940 are now beyond the powers of the Germans, and they have adopted the policy of "setting the sirens sounding." The R.A.F. has lately been doing the same by sending bomber Mosquitos to Berlin on suitable nights, and their losses have been negligible. That is also an example of using speed rather than weight of attack. But these raids on Berlin, useful though they undoubtedly are at a time when the German population is in a state of depression, daily learning of their armies falling back in Russia and Italy, do not constitute the main policy of Bomber Command. That Command relies on the tactics of saturation of the defences, which is the opposite of setting the sirens sounding.

The Germans have no choice; they can only afford to adopt the latter policy. Short raids, mainly by fast aircraft, are all that they can manage, and such efforts, though they cause some tragedies and some minor damage, in no wise shake the *moral* of the British people. Londoners and all other Britons are exhilarated by the turn of the tide and the assurance that victory is now on its way. None the less, everybody wants to make the enemy raiders pay as heavily as possible for their tip-and-run incursions, and so Fighter Command has been meeting speed with speed. It is not so easy to inflict many casualties when there are only a few enemy machines wandering about in the darkness of the night, and we want to ensure that once a raider has been sighted it shall have a poor chance of making its escape. The speed of the Mosquito fighter reduces that chance to a minimum.

BRITISH & U.S. AIR LOSSES TO OCT. 30th

	Over G.B. A'crft.	Continent B'brs.	Continent F'trs.	Middle East A'crft.	N.W. Africa A'crft.
Oct.					
24	0	1	6	0	4
25	0	2	4	3	2
26	0	0	0	0	0
27	0	0	0	0	0
28	0	1	0	3	0
29	0	0	0	0	2
30	0	0	0	2	3
	0	4	10	8	11

Totals: West, 8,242; Middle East, about 2,300; North-West Africa, 1,314.

Of late the Germans have been losing ten per cent. of the raiders they send over. The total of losses is not high, compared with German losses on other fronts, but the large percentage of casualties cannot but have its effect on the nerves of the German pilots. Each crew's chances of a safe return are now much smaller than they were a while ago, while the opposite is the case when Bomber Command stages a saturation raid.

Years ago the Admiralty decided that observers should be eligible to command flights or squadrons in the Fleet Air Arm, but the R.A.F. kept to the principle that such appointments should only go to pilots. However, during the war two observers have been made Commanding Officers of bomber squadrons in the United Kingdom, and one, at least, is an Australian belonging to the Royal Australian Air Force. His name is Wing Cdr. F. Arthur, D.F.C. Presumably, however, the captain of each aircraft must still be the first pilot.

The Fleet Air Arm

A Tale That Needed Telling

OF all the British Fighting Services it is doubtful whether public ignorance is more profound in the case of the Royal Marines or of the Fleet Air Arm. Both are Services under the Board of Admiralty, and both contribute to the work of the Royal Navy, upon which "under the good providence of God, the wealth, safety and strength of the Kingdom do chiefly depend."

Everyone has heard a lot about Taranto, where the predominance of the Italian Fleet was smashed by the torpedoes of naval Swordfish. The share, the all-important share, in the destruction of the *Bismarck* and in the battle of Matapan borne by other naval aircraft is also fairly well known, while the adventures and fate of H.M.S. *Ark Royal* rank among the popular stories of this war. All these events have been described already in brochures published by the Ministry of Information, and yet very little is known about the Fleet Air Arm as a whole.

It was quite time that such ignorance should be dispelled, and therefore this official account* of the Service is very welcome. It is very comprehensive, beautifully illustrated, and very cheap. It gives a brief but sufficient history of naval flying, it explains the organisation of the Service under the Fifth Sea Lord, it goes with a good deal of detail into the training of pilots, other members of aircrews, and maintenance ratings, it recounts the evolution of the carrier, and it describes (without too many technicalities) the aircraft flown by the Navy.

In one way the writer of this brochure may have thought himself unfortunate in that most of the high-lights had already been dealt with in previous official publications. He is obliged to tell once more the stories of Taranto, Matapan and the *Bismarck*, but in the case of the last of these three triumphs he wisely confines himself to the work of H.M.S. *Victorious* and her Swordfish, as the part played by the *Ark Royal* has been described in the official brochure named after that popular and lamented vessel. It is not generally known that the first torpedo strike on the *Bismarck* was scored by the squadron commanded by Lt. Cdr. Esmonde, V.C., D.S.O., who was afterwards killed in the attack on the *Scharnhorst*, *Gneisenau* and *Prinz Eugen* as they escaped from Brest. Nor is it generally known that the A.A. gunnery of the *Bismarck* was so good that Esmonde's Swordfish was hit when four miles away from the German battleship. However, the damage did not prevent him from flying on and afterwards returning safely to the *Victorious*.

Esmonde and his Six Swordfish

There was so much criticism of the sacrifice of Esmonde and his six Swordfish in the attack on the German warships escaping from Brest that it is well that the full story should be told in this book. After the *Bismarck* had been sunk Esmonde's squadron was transferred to the *Ark Royal*, and was in that carrier when she was torpedoed and sunk. The officers and men all survived, and the squadron was re-formed at Lee-on-Solent. It was intended to send it to one of the new escort carriers from America, and it was reduced from nine machines to six. It was expected that the German warships would try to escape from Brest, and, knowing this, Esmonde asked that he might be allowed to lead his diminished squadron against them. Permission was given and support promised. Actually a squadron of 10 Spitfires was provided as escort on the day, and fought hard but in vain to hold off the attacking German fighters. Esmonde himself was shot into the sea by a Focke-Wulf 190.

There are various other incidents mentioned in this book, where interesting details are added to what had been previously published. Many people were surprised that at the battle of the River Plate only one aircraft, a Seafox, was in the air to spot for the guns of the British cruisers. Actually H.M.S. *Ajax*, the flagship, started with two Seafoxes, while H.M.S. *Exeter* had two Walrus boat amphibians on her catapults. Both Walruses were hit by splinters of the shells of the *Admiral Graf Spee*, while the second Seafox of the *Ajax* was damaged by the blast of the ship's own guns. Apparently H.M.S. *Achilles* had no aircraft on board, and so only the one Seafox was able to take the air. It did invaluable work, and was safely hauled on board after the action.

Spotting for the Guns

In February, 1941, Genoa was bombarded by the fleet from Gibraltar, known as Force H. The *Ark Royal* accompanied the force, as was announced at the time. What was not then made public was that the ships when they opened fire could not see the land at all owing to the low visibility, and depended entirely on spotting from the air. This spotting was carried out by catapult aircraft, the carrier only sending up three Swordfish as stand-by spotters, with an escort of Fulmars. The advantage of working that way is that the observers in the air and the gunnery officers in the ships are accustomed to work together and understand each other's little ways.

Another point newly expounded in this brochure was the part played in the second battle of Narvik by the Swordfish floatplane catapulted off the battleship H.M.S. *Warspite*. It explored all the fjords and informed the fleet where the German destroyers were lying, it sank a submarine with bombs, and finished off a damaged destroyer.

What schoolboy could tell us the first aircraft to drop bombs on Italian soil? That would be a good question for a general knowledge paper. This brochure provides the answer. In May, 1940, a naval training school with 24 Swordfish was based at Hyères, in the south of France. When it seemed likely that Mussolini would declare war, twelve of them were formed into a striking force to work under the French Admiralty. They procured French bombs, secured them with spun yarn, fused them before taking off, and on June 10th nine machines, manned by instructors and pupils, dropped 23 bombs on Genoa—with unknown results. Later, when France had collapsed, this striking force flew to Malta, and proceeded to do good work from there.

Another poser for schoolboys (and others) might be: what officer has received both the D.F.C. and the D.S.C., the first a decoration from the R.A.F. and the second one from the Navy? The answer is Lt. (A) H. M. Ellis, R.N., of an Albacore squadron working from Benghazi, who torpedoed and sank the Italian transport *Victoria*, of 24,000 tons, and then flew his damaged aircraft 150 miles across the sea to his base.

In the space at our disposal it would be impossible to review all the information contained in this brochure. It mentions squadrons of Walruses stationed at the Shetlands and in Iceland. It mentions also a squadron of Fulmars which had been trained in army co-operation work and which took part in the landing in N.W. Africa. It describes how the Fleet Air Arm gave air cover to the Army which occupied Madagascar, and also reconnoitred for the troops. It deals with naval squadrons which worked from shore bases in Libya and elsewhere. In fact, there is no end to the interest and information to be derived from this fascinating and well-written eighteenpennyworth.

* *The Fleet Air Arm.*—The Admiralty account of naval air operations. H.M. Stationery Office, 1s. 6d. net.

HERE AND THERE

Gouge for Saunders-Roe

MR. A. GOUGE, B.Sc., F.R.Ae.S., President of the Royal Aeronautical Society, has joined the board of Saunders-Roe, Ltd., and has been elected vice-chairman.

Mr. H. E. Broadsmith, M.I.N.A., F.R.Ae.S., and Captain E. D. Clarke, M.C., joint managing directors, and Mr. H. Knowler, A.M.I.C.E., F.R.Ae.S., chief designer, are also members of the board.

Tasman Empire Airways

STATISTICS in the form of an analysis of the operations of Tasman Empire Airways, recently issued through B.O.A., show that from April, 1940, to June 30th this year this line flew 460 out of its 470 scheduled trips, a percentage of 97.87.

The totals include such impressive figures as 6,173 passengers, 128,695 lb. of freight and 372,902 lb. of mail carried, and 616,200 miles flown in 4,078 hrs.

Airscrew Longevity

A DE HAVILLAND airscrew with a total flying time of 7,500 hrs. to its credit has just been returned to the factory for inspection by B.O.A.

This veteran "prop" is an S.23 two-pitch type which has been on several Empire flying boats, and it has two of its original blades, the third having completed just over 6,900 hrs. service.

It speaks well for the efficient maintenance work of B.O.A. ground crews, no less than for the airscrew's own quality, that it was found to be still in serviceable condition and only in need of a modest amount of attention.

German Rocket Projectile

SINCE our reference, in *Flight* of October 21st, to the Stockholm report of a new German fighter alleged to fire a projectile capable of blowing a bomber to bits with a single hit, it has been unofficially reported that this "secret weapon" is not a gun in the accepted sense, but a device for launching a species of rocket bomb from beneath the wings of a fighter.

Safe Crossings

ALTHOUGH thousands of aircraft have made the North Atlantic crossing during the last twelve months, less than half of one per cent. have been lost, the Air Ministry recently announced.

This high level of safety is due to the reliability of the aircraft, the high training standard of aircrews and the ground personnel. Skilled workmanship of the factories is behind the men who fly the Atlantic ferry, which comprises Transport Command, R.A.F., and United States Air Transport Command, as well as British Overseas Corporation aircraft. The crossings from east to west and west to east have been made in all weathers.

Et Tu, Brute!

"WE alone among the trading nations have no official policy," said Mr. Juan Trippe, president of Pan American Airways, when addressing a foreign trade convention in New York recently on the subject of post-war air transport, and urging the establishment of a single, strong, American international airline which, he said, should be owned and controlled by all American transport interests able to contribute, and operated under a plan approved by the Government.

Come, come, Mr. Trippe. Is not Great Britain also a trading nation?

ONE GONE ALREADY: The symbolic design on this "Wings for Victory" trophy, to be awarded to local authorities which have won their wings in the campaign, depicts a male figure grappling with a three-headed serpent. The three heads represent the three Axis partners, one of which has already been liquidated. William McMillan, R.A., the well-known sculptor, designed the trophy.

Brazilian Air Mission

A BRAZILIAN air mission arrived in Britain to-day for a tour of R.A.F. Stations. The mission is led by Colonel Fabio Sa Earp, senior colonel of the Brazilian Air Force, who received some of his early flying training in this country.

Other members of the mission are Lt. Colonel Reynaldo Joaquim De Carvalho, who is in charge of the Brazilian Government air mail service; Captain Affonso Araujo Costa; Captain Hamlet De Azambuja Estrella, a well-known Brazilian flying instructor; and Captain Henrique De Amaral Penna.

Peaceful Preparations

BRITISH Overseas Airways Corporation have carried about 90 per cent. more cargo and 27 pet cent. more passengers during the first nine months of this year than in the corresponding period of last year.

This increase in air traffic has just been revealed by B.O.A.C., who are busy making post-war plans. They intend to train their own crews in their own schools and research establishments and in South Africa a beginning has been made.

A number of R.A.F. personnel there are being seconded to the Corporation for crew duties on certain routes for up to 18 months, but in order to avoid specialisation in air transport by some at the expense of their friends who are fighting, the men are changed from time to time.

Yet Another

THE determination of the shipping companies not to lose anything by the post-war transference of a proportion of transport custom from surface systems to the air has become increasingly obvious of late, one shipping company after another seeking (and getting) the necessary legal powers to "muscle in" on aviation.

The latest one, at the time of writing, is the Charente Steamship Co., Ltd., which obtained legal authority from the Liverpool Court last week to maintain air services, pleading that without such powers its business might be detrimentally affected.

Indian Appointment

SIR JAMES PITKEATHLY, K.C.I.E., C.M.G., C.V.O., C.B.E., D.S.O., hitherto the M.A.P. representative in India, has been appointed director general of aircraft in the Supply Department of the Government of India.

This office is a newly created one, made necessary by the increasing extent in which India is being used as an operational base, and Sir James' function will be the co-ordination of all work undertaken by the Supply Department in connection with the repair and maintenance of aircraft, and the production of aircraft components.

Incidentally, Sir James was responsible for the lighting arrangements at the 1911 Delhi Durbar, the biggest overhead electric undertaking at that time.

Anticipation at Bristol

SAYING that immediate developments were too closely associated with the war for him to be able to disclose the work which was actively in hand, Mr. W. G. Verdon Smith, chairman of the Bristol Aeroplane Company, in his statement at the 33rd Ordinary General Meeting of the company recently, stressed the need for taxation relief on profits set aside for research work.

Important departures in aircraft engine design were not far distant, he said, and "other possible lines of development are also receiving the closest attention."

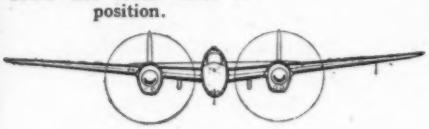
The provision of equipment for research and development was of paramount importance, added Mr. Verdon Smith, and for that reason they had for many years past adopted a conservative policy in the distribution of profits, taking care to retain in the business a large proportion of such trading profits as had been available after taxation. The present burden of taxation was an anachronism in relation to large-scale modern industry in that it had such a seriously limiting effect upon provisions for development.

To Advise Beaverbrook

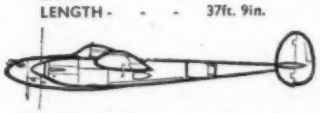
MR. PETER MASEFIELD has been appointed personal adviser on civil aviation to the Lord Privy Seal, Lord Beaverbrook.

The Lockheed Lightning

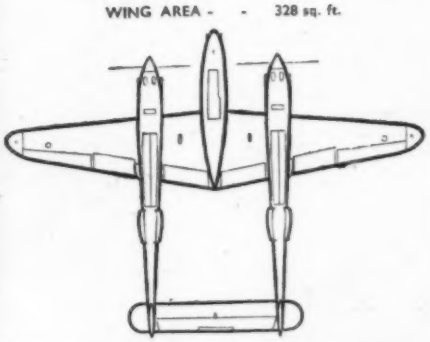
Where the pilot's cockpit fairing comes to a point at the trailing edge of the centre section there are folding steps and a handle. When the steps are folded upwards and forward the handle folds down and locks them in position.



SPAN - - - 52ft.
LENGTH - - - 37ft. 9in.



WING AREA - - 328 sq. ft.



The Allison engines and cockpit of the Lightning.

(Above) An earlier, uncamouflaged, model of the Lightning seen over the tail of a Hudson.

(Below) The undercarriage being retracted as the Lightning passes over the airfield boundary.

America's Twin-engined Long-range Fighters to Accompany Fortresses on Missions

Illustrated Mainly by "Flight" Photographs

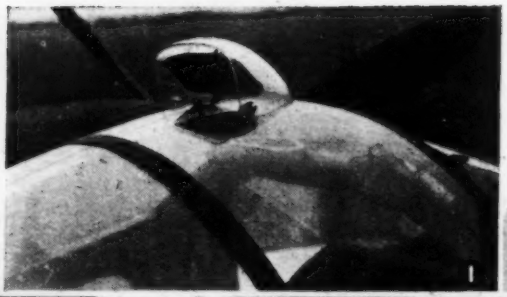
THE Lockheed Lightning—which has just been removed from the American secret list as a fighter in Britain—was first dealt with in *Flight* in March, 1939. We then gave it a top speed of round about 400 m.p.h. and this has been borne out despite General Arnold's claim in October, 1940, that it was the world's fastest fighter and would do over 500 m.p.h.

This over-estimation of its performance is regrettable because the Lightning is a good long-range fighter, and

LOCKHEED LIGHTNING

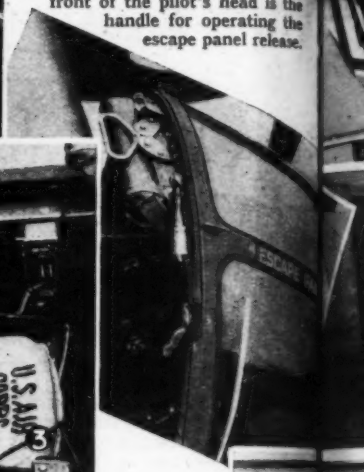
1. On top of the pilot's cockpit is a carefully streamlined "see-behind" mirror.

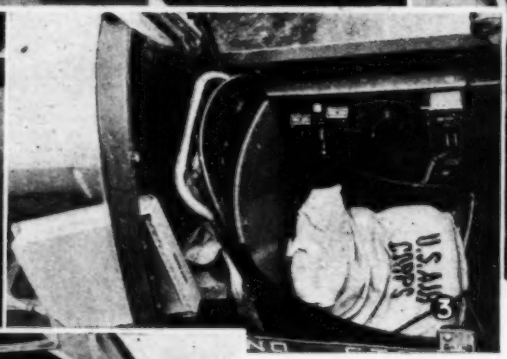
2. The radio set is in the streamlined coaming behind the pilot's cockpit.

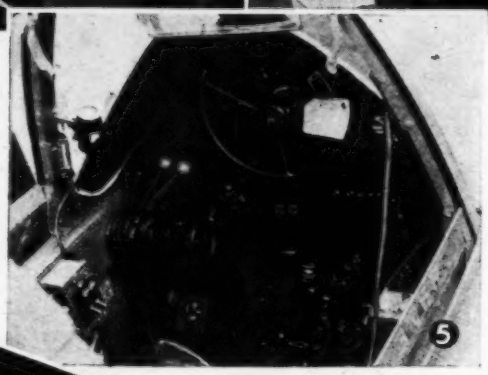


3. The pilot's seat with its slab of armour plate to protect his back. The rectangular container in the left of the photograph is for maps.

4. At the top of the cockpit in front of the pilot's head is the handle for operating the escape panel release.





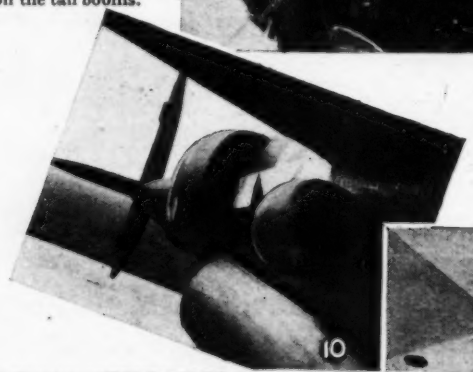


10. Looking along the starboard tail boom showing the air-intakes for the engine and radiator.

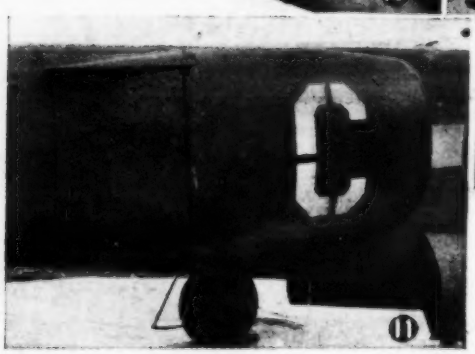
11. The adjustable exhaust at the rear of each of the four radiator units on the tail booms.

5. It is more usual for fighters to have "joy sticks," but the Lightning has a wheel and a girder which pivots on the starboard side of the fuselage. The disc with an arrow at the bottom left of the instrument board is for selective cocking of the guns.

13. A close-up of the armament in the nose of Lightning. The white patch under the guns covers the lens of the cine camera which operates when the guns are fired.



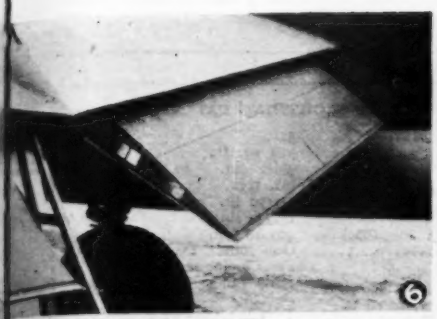
14. How the five guns and ammunition are packed in the nose of the Lightning. The container nearest the camera holds the 20 mm. cartridges for the cannon.



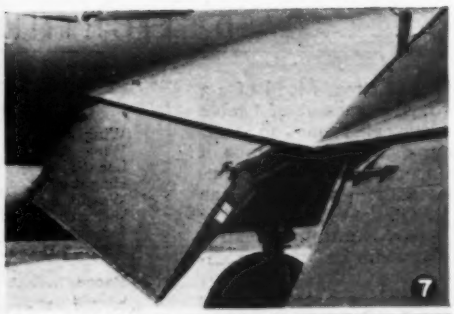
15. Cartridge cases from the .5in. machine guns are ejected through these orifices. The 20 mm. cases are retained within the nose and collected when the aircraft has returned to its base.

12. The G.E.C. exhaust turbo-supercharger for the Allison engines. In the rear orifice can be seen the butterfly throttle which regulates the amount of exhaust gas passing through the turbine.

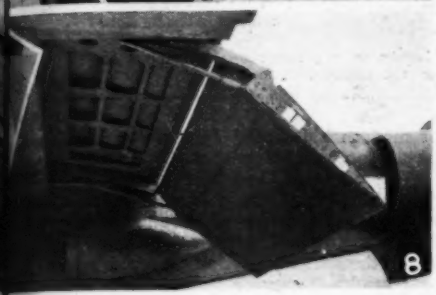
16. During its life the Lockheed Lightning has had a fair amount of tail trouble. It still suffers somewhat from compressibility effects. Large mass balances on the Lightning's elevator.



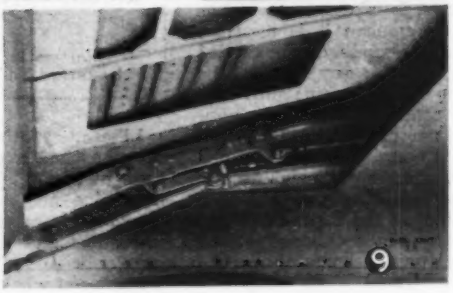
6. One of the Fowler flaps—which are in four sections—partly extended.



7. The two centre section flaps fully extended.

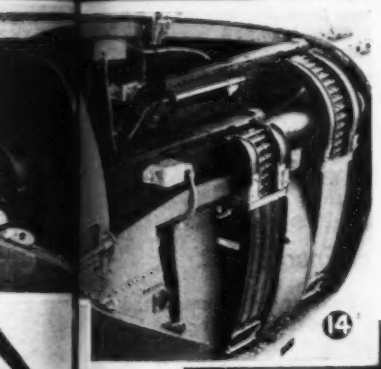


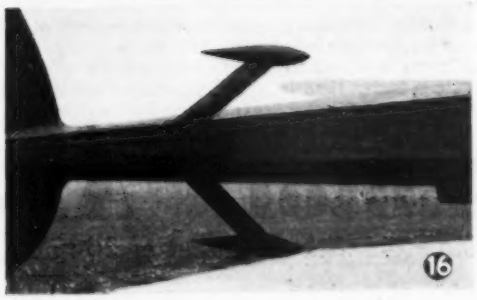
8. View from underneath of one of the Fowler flaps fully extended.



9. The guide rails and mechanism operating the flaps.

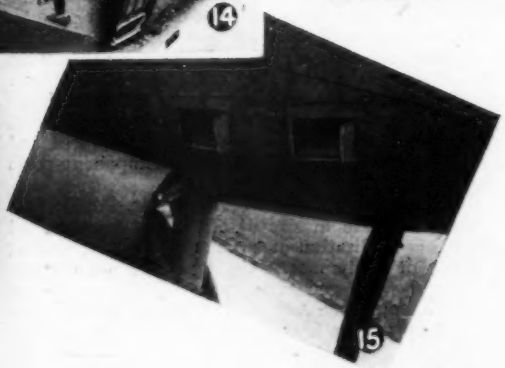
17. The cruciform tail surfaces. The rudder is both statically and aerodynamically balanced by the two rectangular pieces set forward of the hinge line. Note the large trimmer on the rudder.





18. The front wheel of the tricycle is held by an offset arm to keep the point of wheel contact in direct line with the undercarriage leg.

19. The main landing wheels are entirely "overhung" and retract backwards and upwards.



this was proved during the landings at Salerno, where the battle was at the limit of the single-engined fighter's range. The Lightning could stay over the target for about an hour, as compared with the 20 minutes of the single-engined fighters.

Although the ceiling is in the region of 40,000ft., it is to be presumed that the Lightnings will not be used in this country as interceptor fighters but rather as escorts for the Fortresses to keep down the percentage of bomber losses. Hitherto this escort work has been done by Thunderbolts which have accompanied the bombers as far as Emden, but the need is now felt for a fighter which can stay with the bombers the whole way on a deep penetration.

The range of the Lightning is 1,100 miles. Allowing only one escort Lightning to every Fortress, which is a very low ratio, it seems a somewhat expensive method (in guns)

LOCKHEED LIGHTNING

of taking bombs to Germany. The Fortress's load of 2-3 tons will have as protection its own armament of twelve 0.5in. and one 0.3in. machine guns plus one 20 mm. cannon. To this is added the four 0.5in. machine guns of the Lightning. This may be compared with the 6-7 tons load which the Lancaster carries with only its own ten 0.303in. machine guns to defend it. On the other hand, day bombers obviously need greater protection against fighters than do night bombers, and the two are not really comparable.

The Lightning is primarily designed as a height-cover fighter, but as is usual these days, it is also employed as a fighter-bomber. In the Mediterranean it is used for special duties where a bomb load of 1,000 lb. can be carried over a range of 500 miles. Originally the armament of the Lightning was two 0.5in. and two 0.3in. machine guns with a 23 mm. Madsen cannon in the centre. Later the 23 mm. Madsen was replaced by a 20 mm. cannon, and now all the machine guns have a half-inch bore. When fully loaded the ammunition cases hold 300 rounds per machine gun and 120 rounds for the cannon. All the guns are fired electrically by pressing one button on the control column, but selection of firing can be arranged by cocking only those which are required to fire. Each gun is separately cocked by a device below the instrument board in the cockpit.

As to the flying qualities, all the pilots are agreed that the Lightning is quite pleasant to handle and very manœuvrable. It will not, of course, turn within the circle of a single-seater fighter, but any twin-engined fighter suffers from this disability. It lands a little faster than a Spitfire.

LOCKHEED LIGHTNING P38

Wing span	52ft.
Wing area	328 sq. ft.
Length	37ft. 9in.
Height	9ft. 10in.
Weight empty	11,170 lb.
Weight loaded	14,350 lb.
Maximum speed (approx.)	400 m.p.h.
Armament	One 20mm. cannon Four 0.5in. machine guns
Range	1,100 miles
Ceiling	40,000ft.
Engines	Two 1,150 h.p. 12-cylinder Allison, Turbo supercharged

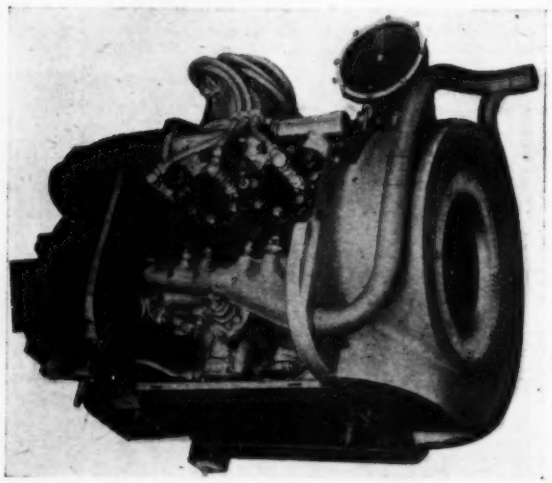
Two 500 lb. bombs or two long-range fuel tanks can be carried under the centre section.

Like every other modern high-speed fighter, the Lightning has had a certain amount of tail trouble. This is brought about by the product of three things: The ever-increasing height at which they fly; the ever-increasing top speed; and the fact that the speed of sound becomes lower in direct proportion to the lower air density at the greater heights. When the speed of sound is reached by an aircraft—at whatever height it may be flying—the normal streamline airflow breaks down and pressure waves are set up on various parts of the structure. The tail is usually the first to be affected, and a number of tails of single-seater fighters have parted company with their fuselages. The Lightning has been no exception to the rule, but the trouble is now overcome.

The Rotol "A.G.P."

A New Auxiliary Generating Plant with an Output of 20 Kilowatt Continuous Rating

SO numerous have become the activities of Rotol Airscrews, Ltd., that the name of the company may have to be changed to Rotol, Ltd. This was announced by Mr. R. H. Coverley, controller of the firm, at a luncheon given in London last week to introduce the new Rotol auxiliary generating plant for aircraft. Mr. Coverley recalled that Rotols had called in Mr. D. R. Pobjoy some three years ago to design certain auxiliary equipment, the first of which was accessory gear boxes for aircraft engines. Mr. Pobjoy pointed out that at that time there were already in existence such gear boxes produced by the parent firms (the Bristol Aeroplane Co., Ltd., and Rolls-Royce, Ltd.), and that his task was to co-ordinate and standardise their efforts. Gear boxes were, therefore, designed to suit all engines, three being standardised with six, three and two drives respectively, all the internal component parts being interchangeable.



The Rotol A.G.P. unit, type P.6, removed from its box. Alternator and D.C. generator are mounted at one end, the cooling fan at the other.

Of the new A.G.P. unit, as it is called, Mr. Pobjoy said that with the increase in size of aircraft a demand had arisen for the centralisation of auxiliary power for driving the multitude of equipment. The idea was not claimed to be new, and small generating plants had been in use for some years, but in the A.G.P., P.6 type, they had gone a great deal farther than battery charging and the working of bilge pumps. The Rotol scheme is that all aircraft services shall be operated by independent electric motors located where most convenient, and that the electricity for their operation should be supplied by one or more main generating plants. These should be placed in the hull or fuselage of the aircraft, where they are readily accessible. To guard against any possible failure due to enemy action, the set should be duplicated in one engine room, one set running at full speed and doing all the work while the other is idling but ready for instant use should the need arise. The switch gear is so arranged that the flight engineer can switch the load from one set to the other without interrupting the supply. Normally the sets will be controlled from the flight engineer's station, which may be situated quite a long distance away from the "power station."

To prevent the escape of fumes into the fuselage or hull of the aircraft, the entire unit is enclosed in a box which is vented directly to the exterior of the aircraft. The box

THE ROTOL "A.G.P."

is lined with sound-proofing material and the exhaust is silenced so that, in a flying boat at moorings, for example, the set can be kept running without interfering with the comfort of the crew.

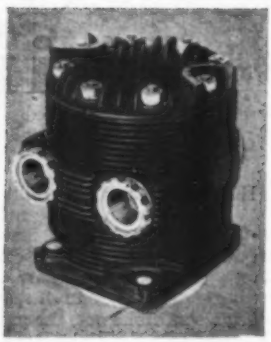
Basically the A.G.P. unit comprises a petrol engine which drives two electric generators, an alternator coupled direct to the crankshaft, and a D.C. generator mounted above the alternator and gear driven from the engine. Actually there is a third generator built in tandem with the second, used to provide excitation for the alternator.

The Generators

The alternator, being coupled direct, runs at engine speed, i.e., 3,750 r.p.m. Its continuous rating is 20 kilowatts, but it has a maximum rating of 32 kilowatts for short periods. The alternating current is of 110 volts, 250 cycles, and is three-phase. The D.C. generator is gear driven from the engine at 4,600 r.p.m. Its continuous rating is 3 kilowatts, with a maximum output of 5 kilowatts.

For the 37 kilowatts maximum, plus approximately 5 h.p. required to cool the engine and generators, 62 b.h.p. is required from the crankshaft. Mr. Pobjoy explained that in designing the petrol engine for driving these generators he was led to the choice of air cooling by the simplicity of that system, and to sleeve valves because of the absence of the need for maintenance and attention for very long periods. He decided that they could not do better than go to one of their parent companies, the Bristol Aeroplane Co., Ltd., who had vast experience of sleeve valves on high-power aircraft engines, and they had received every possible help. Ever since joining the Cosmos company after leaving the army after the first world war, Mr. Pobjoy said he had been a disciple of Sir Roy Fedden, who had done so much to develop the sleeve valve for aircraft engines. When he first contemplated their use in such a small high-speed engine he was warned by many friends that he would find that internal friction would be excessive and oil consumption high. Results had not proved this to be the case. The A.G.P. unit had been found to maintain its full overload power up to 14,000ft. instead of the 11,000ft. which had been estimated. That proved that internal friction was not high. The oil consumption was only half a pint per hour, which was below average.

The complete unit in its box, mounted on a tubular stand. The outer lid has been removed to show the inner casing around the engine.



A sleeve and cylinder of the Rotol A.G.P. unit. The engine is of short stroke (3in.).

As for the engine itself, it is of the six-cylinder opposed type, with a bore of 3.375in. and a stroke of 3.0in. The swept volume is 2.64 litres (161 cu. in.) and since high octane fuel is used (87 to 100) the compression ratio is high, 7.8:1. The centrifugal controller keeps the engine to a speed of 3,750 r.p.m., which is almost independent of load. The rated altitude of the engine (it is naturally aspirated) is 12,000ft., and the rated power 60 b.h.p., although it actually develops 93 b.h.p. The weight, incidentally, of the complete unit, including sound-proof box and mounting frame, but excluding ducting to the outside of the aircraft and the local controls and regulating panels, is 450 lb.

Sleeve Valve Operation

The cylinders are machined from light alloy, and as the opposing cranks are at 180 deg., the cylinders are slightly staggered. The valve sleeves are virtually Bristol sleeves in miniature. They are operated by small cranks arranged vertically on top of the crankcase. The cranks are connected together by a train of spur gears from each bank of cylinders. Vertical spindles on each side drive the train of gears and also, at their lower ends, operate the scavenge and oil pumps in the crankcase sump. These vertical shafts are driven through bevel gears by short horizontal shafts engaging with a train of helical spur gears located at the generator end of the crankcase and driven by a pinion mounted on the crankshaft.

Pistons are of light alloy and have two gas rings and two scraper rings. The connecting rods, of steel, have their big-end caps secured by two setscrews, the joint face being serrated. The small ends have bronze bushes for the floating hollow gudgeon pins. The six-throw crankshaft is carried in four plain bearings and a large ball bearing located close to the alternator rotor which, by the way, acts as a flywheel. At the opposite end of the crankshaft is the multi-blade fan which cools engine and generators. This fan is rubber mounted and helps materially in damping torsional vibration. Lubrication is of the dry-sump variety, the scavenge pump being of larger capacity than the pressure pump.

What the Rotol A.G.P. unit is designed to do is to make all aircraft services electric so far as the central "power-house" is concerned, using electric motors conveniently situated in the aircraft close to the work they have to do, be that mechanical, hydraulic or pneumatic. The electric current is available for the following purposes: starting the main engines; operating undercarriages, flaps, radiator shutters (in liquid-cooled installations), cowling louvres (in air-cooled engines), main throttle servos, electric airscrew-operating mechanism, electrically operated air pumps for navigation instruments, automatic pilot and aircraft wheel brakes; providing electricity for lighting, heating, radio, de-icing, air-conditioning and charging stand-by batteries.

Seventy-third of the Latest Recognition Series

Aircraft Types and

BLOHM and VOSS Bv 222

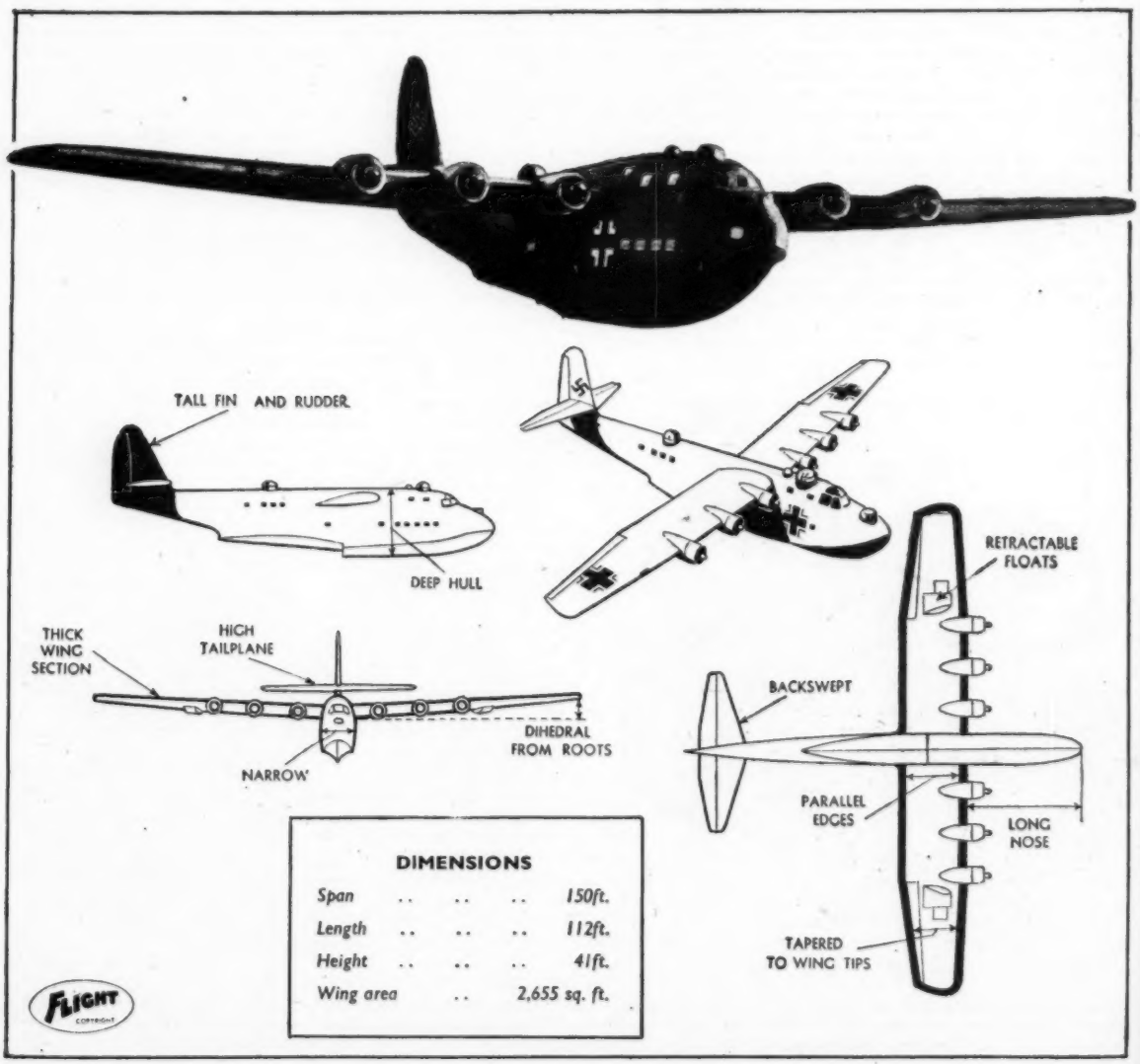
LIKE many another military and naval aircraft the Blohm and Voss Bv 222 six-engined flying boat was originally designed, before the war, as a passenger-carrying machine. In this case it was meant for a trans-atlantic service proposed by the Deutsche Lufthansa, the aim being the provision of really spacious accommodation.

When war broke out, the preparations then under way for the manufacture of these large flying boats were carried on, but modifications were at once made to convert them into military transports, and a limited number of Bv 222 flying boats have for some time been in service in Germany's many theatres of operation between the north of Norway to the Mediterranean area. Several were destroyed during the Tunisian fighting when Rommel used them in his desperate attempts to get over more reinforcements.

Powered by six BMW 132 Dc air-cooled radial engines of 1,000 h.p. each, the Bv 222 has a top speed of only 175 m.p.h. at 10,000ft., while its economical cruising speed is in the region of some 130 m.p.h. This indifferent performance could, of course, be improved by the use of more powerful engines, but it is extremely unlikely that Germany, with its production battered by the R.A.F., could afford to spare any of its best engines for transport aircraft.

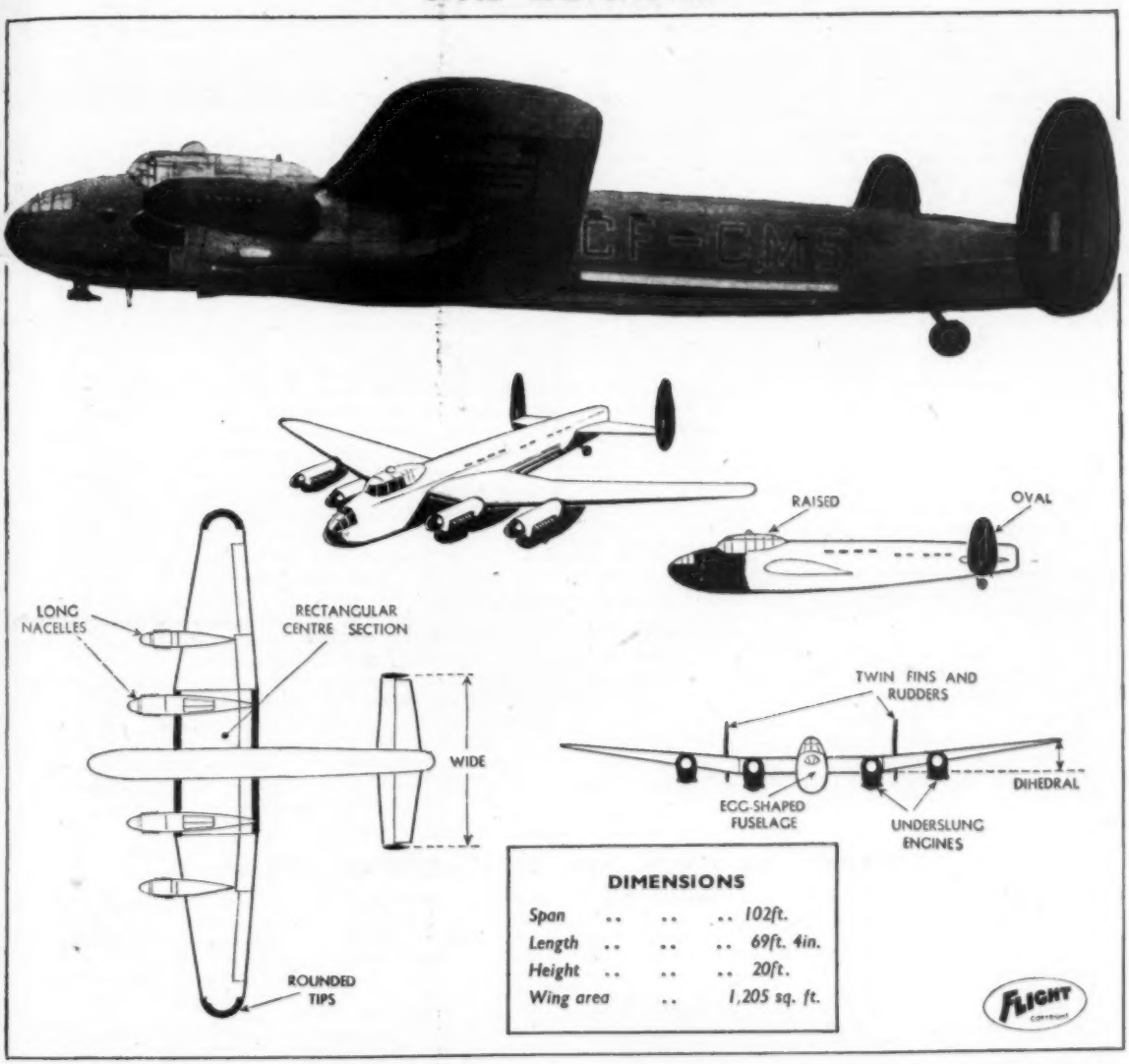
Aerodynamical cleanliness is an obvious feature of its design, for the high wing is of the cantilever type and its stabilising floats retract inwards. In plan the wing has a wide rectangular centre-section on the leading edge of which are mounted the six engines, the apparent size of which is dwarfed by the overall dimensions of the aircraft. The short outer panels are tapered to broad, blunt tips, but the sharply tapered cantilever tailplane has very small tips and is mounted a short way up the fin.

The two-step hull is slab-sided and narrow compared with its generous depth.



Their Characteristics

CIVIL LANCASTER



DIMENSIONS

Span	*102ft.*
Length	*69ft. 4in.*
Height	*20ft.*
Wing area ..	*1,205 sq. ft.*

ALTHOUGH only one version of the civil Lancaster is at present in service, it will be seen flying in certain parts of this country, for its main duty is to carry mails for the Canadian Forces in Great Britain, and official passengers.

The aircraft was flown out to Canada in August, 1942, by R.A.F. Ferry Command and it was duly handed over to Trans-Canada Airlines, who were to operate the trans-Atlantic mail service for the Canadian Government, after the necessary modifications had been carried out. The service actually began in July of this year, and on its first transatlantic flight, it will be remembered, the civil Lancaster set up a new record of 12 hr. 26 min. between Montreal and Great Britain, carrying three passengers in addition to its crew, and some 2,000 lb. of mail.

The outwardly visible modifications made in the course of converting the bomber into a civil transport type has been the removal of the power-operated gun-turrets from the nose, tail, and dorsal position. The tail of the fuselage has been faired over, and the aggressive snout of the bomber has given place to a smoothly rounded nose, the upper half of which is transparent. Internally, the fighting impedimenta of a combat aircraft has disappeared, and there a number of passenger seats have been installed.

Structurally, however, the aircraft still remains very much the same, and despite the sleek, peaceful nose and absence of armament, the aircraft is still recognisable as a Lancaster if only by its characteristic tail, oval fins and rudders. As in all Lancasters, the cantilever mid-wing has a flat rectangular centre-section, carrying the inner engines, and uniformly tapered outer panels, on which are mounted the outer engines, the wing-tips being rounded.

Powered by four underslung Merlin engines, the top speed of the civil Lancaster is in the region of 300 m.p.h., and though no specific figures have been issued for publication in respect of its maximum range, cruising speed, ceiling and so forth, it can reasonably be assumed that these compare fairly closely with those of the bomber type.

Vice-regal Sunderland

B.O.A.C. Flying Boat Makes History : Lord Wavell First Viceroy to Fly to India to Take Up Office

LORD WAVELL'S recent journey to India and Lord Linlithgow's voyage home were made in one of British Overseas Airways Sunderland flying-boats. This type, which is extensively used by the R.A.F. Coastal Command, was developed from the civil Empire flying-boats which are in use on British Overseas Airways Corporation's Durban-Calcutta route. A number of Sunderlands, modified for passenger and cargo service, are in operation on British Overseas Airways West African services.

The flying-boat was specially fitted up for the long journey to India at the Marine Base shops of British Overseas Airways, where the whole of the design and installation was carried out.

On the Sunderlands used on the Corporation's African services, the stages being comparatively short, sleeping accommodation is not provided. The fitting out of this Sunderland has produced an extremely useful type of aircraft for day or night use. The "B" compartment, which is the crew's room in the R.A.F. Sunderland, has been upholstered in grey, and there are comfortable chairs for six people, which can be converted into two bunks for night travel. The walls and ceiling are in different shades of grey hide, and the floor covered with pile carpet. As a relief from the grey, there are silver anodised mouldings on the walls, and the bunk curtains are bright blue and white. Immediately forward of the compartment is a curtained wardrobe.

Compartment "C," which used to be the pantry and drogue compartment, has been converted into toilet and washrooms, the passage being carpeted in bright grey and the doors in white.

The most extensive work was necessary to convert compartment "D," which in the R.A.F. Sunderlands served to hold the bombs, depth charges and spare engine fittings, and had two bomb doors. This has been also upholstered in the same style as compartment "B," and on each side there are three seats which can be converted into four bunks. All the bunks are fitted with reading lamps, steward's call pushes, and there are roof lamps in each compartment.

Farther aft is the state-room, which has two permanent bunks. On the port side is an adjustable chair and desk, and aft is a curtained wardrobe and a washbowl with its own water supply. Farther aft again is the pantry, complete with electric kettle and electric hot-plates, refrigerator, etc. Throughout there are special tables for attachment to the chairs, and on which meals are served.

The upper deck, which is the crew's quarters, and in the standard Sunderland extends to about midships, has been lengthened aft as far as the pantry and provides ample accommodation for the crew and also stowage room for freight and for bedding when not in use.

The modifications and furnishings were planned and carried out by the Technical Development Branch of the Corporation. The officials directly in charge were Mr. A. Jardine, Mr. C. E. Jackson and Mr. W. B. Beckett.

The crew of the Sunderland comprised the Captain, First Officer, Navigation Officer, two Radio Officers, two Engineer Officers and a steward. Capt. J. L. M. Davys, the Commander of the aircraft, is one of British Overseas Airways' senior Captains. He has been flying for 14 years over Europe and along the Empire routes over Africa, India and the East. He was one of the five British Overseas Airways' Captains who took their unarmed flying boats to Crete at the height of the evacuation and brought off large numbers of British soldiers and airmen.

A second Sunderland with the standard British Airways' passenger equipment flew in company with the Vice-regal aircraft, carrying members of the staff. Brig. Gen. A. C. Critchley, the Director-General of British Overseas Airways, who is making an inspection tour of the Corporation's Indian and African routes, was a passenger as far as Karachi on the outward journey.

AWARDS TO B.O.A. AIR AND GROUND CREWS

THE pilot of an unarmed civil Mosquito and his radio officer head the list of awards for courage and devotion to duty recently made to personnel of British Overseas Airways Corporation. They are Capt. Gilbert Rae and Radio Officer James S. Payne, who for some time have been regularly flying between this country and Sweden and have twice been attacked by enemy fighters.

Capt. G. Rae, O.B.E.

Besides the O.B.E. and M.B.E. respectively, Rae and Payne have received B.O.A. Certificates of Commendation.

The official Air Ministry citation says: "The King has been graciously pleased to approve the appointment of Capt. Gilbert Rae and Radio Officer James Stanley Wood Payne, both of the British Overseas Airways Corporation, to be an Officer and a Member respectively of the British Empire Order in recognition of their high courage over an extended period in flying unarmed aircraft on the civil wartime air service between the United Kingdom and Stockholm.

"When Capt. Rae was attacked some time ago over enemy-occupied territory his aircraft was damaged by cannon fire and the undercarriage hydraulic system was put out of action. By the most skilful evasive tactics and exceptional coolness in a most hazardous situation he was able to avoid further damage, to shake off his assailant, and eventually make a forced landing in Sweden with the undercarriage retracted. The forced landing was made with such skill that comparatively little damage was done to the aircraft.

"A few days later Capt. Rae was again attacked by two German aircraft, but by his skill and coolness he was able to shake off his assailants and land safely.

"On a third occasion, half-way across the North Sea with a very heavy load, one of his engines failed, and it was only due to superb airmanship that he managed to get safely back to base.

"On all these occasions Mr. Payne has been the radio officer of the aircraft. He has cheerfully and readily accepted the same risks as his pilot. His skill as a radio officer and his coolness in the face of extreme danger have been outstanding."

Other recipients of Certificates of Commendation are Traffic Officer P. C. Armour (Malta), Radio Officer R. Z. Martin (since deceased), Mr. J. Venn (England), Head Launch-boy Omune (Kenya), Woman Seaman U. P. Bate (England), and Engineer Officer H. A. V. Rawlinson (Eire), all of whom have exhibited gallantry and devotion to duty in various ways.

THE "AUTOMOBILE ENGINEER"

THIS week the *Automobile Engineer* Annual Extra Number will be published, dealing on this occasion entirely with the subject of Electrical Transport. As in former years, the price is 2s. 6d. per copy, or by post 2s. 9d. Readers who wish to make sure of their copy should arrange with their local newsagents at once, or post an order with remittance direct to Iliffe and Sons Ltd., Dorset House, Stamford Street, London, S.E.1.

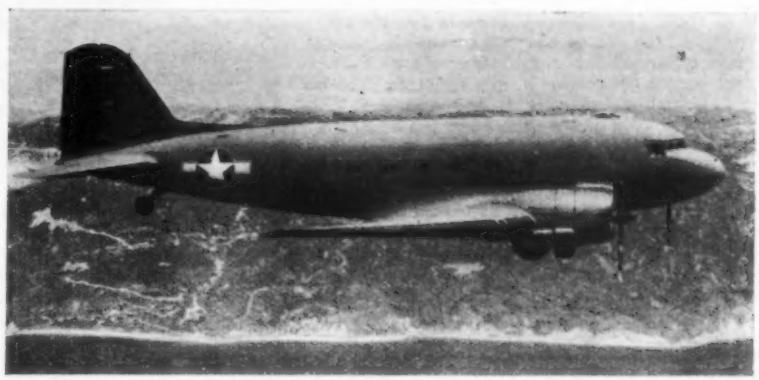
The Cruise of the "Galloping Gremlin"

International Air Travel in Wartime: The Battlefields of Tunisia: Over Salerno Beaches

By JOHN YOXALL

IN the two previous issues our representative described what he saw of the air war in the Mediterranean area and of the men and machines that have made and are making history there.

This week he gives an account of the flight itself, one of about 8,000 miles, made in Dakotas of the Air Transport Command and of British Overseas Airways.



For a wartime military transport, the Dakota is a shapely aircraft. It was developed from the Douglas D.C.3.

LET me, first of all, point out that the title of this article is somewhat of a misnomer. The "Galloping Gremlin" did not put in an appearance until Algiers was reached, and goodbye was said to it at the same spot on the way home, but the whole of the journey was made on Dakotas.

The chief differences between wartime air travel and that which we enjoyed in the days of peace are the extra regulations and the severity of the security branch. Every piece of paper, every book, even plain writing paper has to be submitted to Censor and sealed before starting on the journey. Special dispensation must also be sought if you wish to take more than £10 of English money out of the country.

With their customary helpful politeness, the British Overseas Airways Corporation (I went as a civilian as far as Rabat) do their best to make these regulations as little irksome as possible; and the officials themselves are very polite, if insistent.

On the night take-off, gone is the joy and thrill of watching the airfield become a lighted model below as the air-

The terminal buildings and tarmac at Portella Airport, Lisbon. Flying boats land on the River Tagus, which adjoins the airport.

THE CRUISE OF THE "GALLOPING GREMLIN"

FLYING TIMES

Britain—Lisbon	7 hrs. 41 mins.
Lisbon—Rabat	2 hrs. 32 mins.
Rabat—Algiers	3 hrs. 26 mins.
Algiers—Tunis	3 hrs.
Visits in Tunis area ..	1 hr. 40 mins.
Tunis—Syracuse	2 hrs. 4 mins.
Syracuse—Gerbini	30 mins.
Gerbini—Taranto	1 hr. 48 mins.
Taranto—Gioja	32 mins.
Gioja—Bari	19 mins.
Bari—Salerno	1 hr. 16 mins.
Salerno—Montecorvino ..	12 mins.
Montecorvino—Syracuse ..	1 hr. 58 mins.
Syracuse—Malta	47 mins.
Malta—Tunis	1 hr. 55 mins.
Tunis—Algiers	2 hrs. 45 mins.
Algiers—Rabat	4 hrs. 17 mins.
Rabat—Gibraltar	1 hr. 30 mins.
Gibraltar—Britain	8 hrs. 55 mins.
Total	47 hrs. 7 mins.

Mileage at 155 m.p.h. = 7,466.

Part of Algiers waterfront. The city is built on a steep hill facing almost due east.

craft rises. For security reasons the aircraft windows are covered over. Not that it makes much difference at night time because the black-out on the ground is very effective. There is, of course, another and very good reason for the covering-up of the windows: the considerable numbers of Ju 88s which prowl over the Bay of Biscay during the hours of darkness.

Before leaving, our personal and baggage weight had been very carefully checked in order that the loaded weight of the Dakota in which we travelled might be fully employed. As it was there was a considerable amount of freight carried, some of it being stowed in small packages by each chair.

Blind Flying

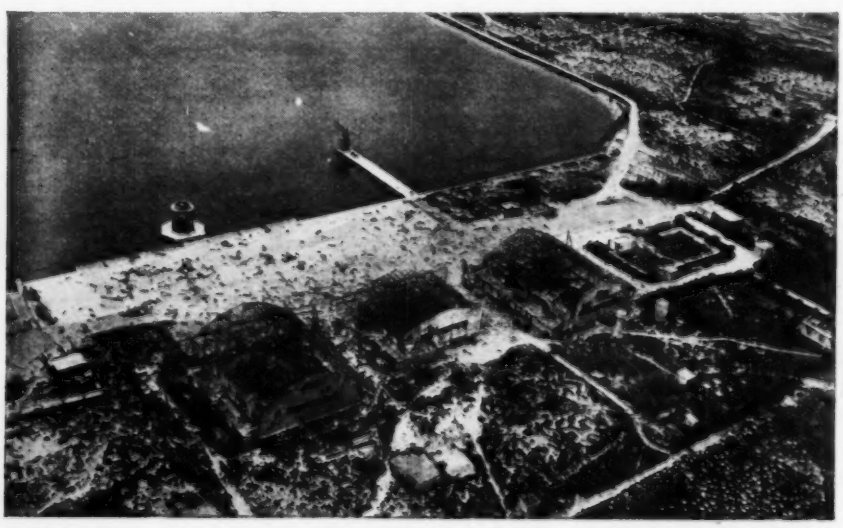
Black-out take-off gives one a queer feeling. One sits in the semi-comfort of a wartime chair and imagines the sequence of events. Start up both engines—the port engine requires three attempts by the inertia starter before it gets going; a slight movement forward as the brakes are released; taxi out to the leeward end of the runway and run up both engines before turning into wind waiting for the green "O.K. for take-off" signal. As soon as the Dakota is airborne the difference in the sound of the airflow tells of the undercarriage being tucked up and the engines throttled back to normal cruising.

After a long and exciting day all the passengers are glad to wrap rugs round their knees and, after a belated supper from the boxes thoughtfully provided by B.O.A.C., attempt to sleep away the long hours until Lisbon is reached.

Each time one wakes up the steady drone of the engines impresses itself, and half-way through the night the nose is put down and a succession of small bumps can be felt as we go down through the cloud layer.

At the first light of dawn the engines are throttled back and the wheels touch down on the 1,500 metre runway of Portella airfield at Lisbon. Lisbon airport is, of course, an exciting place at which to arrive. In the main hall, on the left, is the *Deutsche Lufthansa* office with its bespectacled and angular-headed occupant reading the "Berliner Illustriete," and immediately opposite are the B.O.A.C. offices. Out in the town it is reasonable to expect that the conversation of newly arrived Britons will be of interest to the enemy; the conversation is therefore fitted to the occasion.

It is here one senses the impotence of Germany. Whereas we are able to travel the world over at will, the German is a prisoner in his



A close look at the much-bombed and burnt-out sea-plane station at Tunis.

own European Fortress. In the city both we and the Germans have publicity shops. The Germans show all the horrors of war with great glee and wonder why they get but few customers. We tell the Portuguese what a lovely place the world will be after we have won the war. This goes down rather well because the Portuguese, having associated themselves with us for some six or seven hundred years, remember that we have a rather deep-rooted habit of winning wars.

Portella airport, which has only recently been completed has a very modern layout and is well equipped—almost wholly by British manufacturers—but one feels it is likely to be rather on the small side for an international airport.

A considerable percentage of the arable land on Pantellaria went to make up the airfield. The famous underground hangars are facing the camera on the far side of the airfield.

On the airfield were some Blenheim IVs with Portuguese markings, a Savoia Marchetti 75, and some force-landed Marauders and Liberators. Some of the latter were bearing the U.S.A.A.F. markings and some were in our Coastal Command white camouflage. In the corner of the control room is a whole heap of parachutes and flying equipment impounded when their wearers were interned.

North Africa

After a brief night in civilisation (we were held up by bad weather) the Dakota took off again and headed for our first African port of call at Rabat Sale on the north-west coast of Africa. Half-way across we ran into some electric storms which were not considered severe. Nevertheless, the Dakota was thrown about like a piece of paper, which made one realise what our peacetime record-breakers, flying Puss Moths and the like, had to put up with when battling through this sort of weather and through monsoons

Rabat Sale is a permanent French Moroccan airport which has been adapted to wartime needs by the laying of a Marston-strip runway. These steel strips, and our Somerfeld steel wire-mesh runways, are to be seen frequently all the way along the North African coast. The weight of a Marston runway is 2,000 tons, which is quite a transport problem of itself.

At Rabat we left the charge of B.O.A.C. and were handed over to the Air Transport Command. This can be thought of as the biggest air-operating concern in the world. After a short wait and a reweighing we went aboard another Dakota. It was of the paratroop type and there was no pretence at comfort. Along each side were a number of metal depressions to represent seats, and no parachutes were carried. There were 23 passengers and a lot of luggage on board, but the take-off still appeared to be fairly short.

From the air the North African littoral was interesting if awesome from a forced-landing standpoint. The country was parched brown and very broken, with little bits of vivid green in all the valleys. Lots of stunted trees dotted the hillsides and I did not see a tall tree in the whole of North Africa. In the distance, inland, were the Atlas mountains, where Sqn. Ldr. Jones-Williams and Flt. Lt. Jenkins crashed in the winter of 1929 when attempting a world's record long-distance flight on the Fairey-Napier

Mount Etna, the Sicilian volcano, seen with long shadows in the early morning light. It is 10,868ft. high and its base is approximately 400 sq. miles in area.

THE CRUISE OF THE "GALLOPING GREMLIN"

The Straits of Messina. This photograph shows clearly how impossible it was for us to stop the Germans evacuating to the mainland. The Messina docks (in the middle distance) were laid flat by bombing. On the morning of the invasion 1,100 gun muzzles faced this narrow channel.

A jeep passing two disabled German tanks. This was a very frequent sight on all the roads in the Salerno battle area.

monoplane. These mountains rise to some 14,000ft.

After landing for refuelling at Ujda, the Dakota took off for Algiers. We had one false start because the undercarriage safety pins had not been taken out and the legs would not retract. A further one and three-quarter hours' flying, mostly over the clouds, brought Algiers, the Allied Forces Headquarters in Africa, in sight.

We touched down on the metal runway of Maison Blanche airfield, which was the first airfield to be captured when the Allies entered Algeria. Our arrival coincided with the end of a heavy rainstorm which had left the surface very wet and soft in places. At home we are prone to think of the Mediterranean and its environs as being all blue sky and sunshine. Don't believe it. As I was being driven into Algiers we passed through a mile or so of very thick fog, which ended as abruptly as it started.

The military traffic on this road has to be seen to be believed. Driving on the Brighton road on a peacetime Sunday evening is child's play by comparison, but we completed the ten miles without trouble until an off-side rear wheel decided to part company with its half-axle. We walked the rest of the way.

The next morning found us on our way to Tunis in yet another Dakota—this time the "Galloping Gremlin"—which was to be ours until we returned to Algiers. It bore the five-pointed star of the U.S.A.A.F. and had an American crew of two co-pilot lieutenants, a technical sergeant and a radio-operator sergeant. We were flying over rather more prosperous land, with the sea on the left and the Little Atlas mountains on the right. On the coast between Algiers and Tunis the rainy season starts in October, and since it was already the end of September changeable weather could be expected. On the first part of the journey, however, hot sun shone out of a blue sky, and it was surprising to me that the air was so steady despite the heat and the irregular ground below. Quite suddenly the weather became thick, and we did not break clear until we were over the Tunisian battlefields.

War Area

The scars of war are very short-lived in this part of the globe, mostly, I suppose, because of drifting and blown sand. Although we passed within sight of such places as Medjez el Bab, Longstop Hill and Mateur, only a very few bomb and shell holes could be seen. Coming lower we passed over a number of Axis aircraft lying where they had been shot down or burnt out; and finally we landed

THE CRUISE OF THE "GALLOPING GREMLIN"

at El Aouina airfield, which is the peacetime airport for Tunis.

From Tunis we flew out to visit some of the Coastal and Strategic squadrons on their desert landing grounds. The difference in temperature is most marked. On one desert airfield the thermometer showed 101 degrees in the shade, and at Kairouan it reached 110½ degrees.

Across the Mediterraean

Our flight from Tunis was to Syracuse in Sicily. Most of the journey was, of course, over the sea, and we passed within sight of Pantellaria on the starboard side. Its size was quite disturbing. Having seen it only as a tiny spot on thumb-nail maps in the daily papers, a sizeable mountain and small plain rising out of the sea come as rather a shock. The attack on Pantellaria, it may now be related, was a try-out for the invasion of Europe. Six thousand tons of bombs were dropped on the island, and intelligence officers were able to go in and study the results almost immediately.

We crossed the Sicilian coast where the landings were made. There are still a few landing barges derelict on the beaches, and occasionally a destroyed bridge can be seen. From the air it is, however, extremely difficult to believe a 3,000-ship invasion had passed that way but a short while ago. In Syracuse harbour itself there were a number of sunken ships, but these were the results of our own bombing while the enemy held the port.

From Syracuse the take-off run led over a beautiful blue-green sea with small rocks, each with a fringe of white, breaking the surface at intervals. Turning as height was gained we flew on to the Gerbini airfield farther north in the island. Of these Catania airfields there are no fewer than 13 almost adjoining one another, and it is difficult to select the right one. We picked out the wrong field the first time and had to take-off again. As I have related, these airfields were pattern bombed by the Strategic Air Force, and they present an incredible sight from the air. The whole area is covered with bomb craters, filled-in and otherwise, and a multitude of burnt-out Me 109s and Fw 190s. In Sicily alone, it must be remembered, we found over 1,000 enemy aircraft in varying stages of damage.

Enemy Territory

Europe proper—Taranto in the Italian instep—was our next port of call. However hard-boiled one may pretend to be, there was a very distinct thrill in flying over what was enemy territory only a short time previously.

We passed via the Straits of Messina, and from the air it is obvious why we could not prevent the Germans from getting away to the mainland. The water is so narrow that a twenty-minute trip by small boats at night was sufficient for the crossing. Although we were over Europe the weather was still very hot in the cabin and most of the passengers were dozing at times. We were unarmed, and a Beaufighter on a slightly divergent course looked somewhat like a Ju 88 and brought a moment's apprehension, but all was well. Over the Taranto airfield we were challenged from the ground and promptly fired the "colour of the day" recognition signal.

On the journey to Gioja, our next stop, we flew over Taranto harbour, where until recently half of the Italian fleet had been stationed. Now all shipping there is under our control, protected by torpedo nets.

Bari (on the Adriatic coast) and its airfield had been in our hands for a few days, so we flew on up to that town, which is somewhat of a showplace of the Fascist *régime*. It certainly has some fine buildings, but to me it is chiefly remarkable for the fact that I ate octopus for the first, and possibly the last, time. It tastes rather like a tough lobster, and my imagination is such that I saw all the time one of Walt Disney's octopuses staring at me with baleful eyes.

Part of the Grand Harbour at Valetta, Malta. Some of the bomb damage can be seen in the foreground. Rebuilding is already in progress.

Over Salerno

"..... and to see a battle, and the adventures thereof below ..... and to see the errors, and wanderings, and mists, and tempests, in the vale below; so always that this prospect be with pity, and not with swelling or pride."
FRANCIS BACON.

The next part of the trip was the *pièce de résistance* of the whole journey. It was over to the Salerno invasion area by way of the Gulf of Taranto and up the bed of the river Sinni. We went that way to avoid the mountains.

To fly over any of this occupied part of Italy is a cheering sight. Every road, so far as the eye can see, has motor transport, nose to tail, taking up vast quantities of stores to the fighting area. It is proof positive of the defeat of the *Luftwaffe*.

After flying through lovely clouds with mountain peaks peeping through them, the west coast was reached at Sapri. Back over mountains at Infreschi Point we gradually lost height, and sneaking in round the lower hills which come almost down to the sea we landed at a Salerno airfield, which was made under shellfire during the early days of the landing.

Speaking of the early days of landing, there has grown up out here a new sort of aristocracy, irrespective of rank, unit, service or nationality; those who landed on D day (the day of the invasion) are the lords of creation. The D plus ones, twos and threes are quite big noises, but you hear some men apologetically murmur that they are only D plus tens.

From this airfield I made a short tour of the area and the beaches by jeep in order to get a close look at things. The roads are so choked with dust that windscreens have to be lowered because they soon become opaque, and all driving is done in a dense dust-fog. All the drivers have to wear close-fitting goggles to enable them to see at all.

Battered German and Allied tanks litter the countryside, but the German wrecks are in the majority. It struck me that we must be using some very potent anti-tank weapons because in nearly every case the complete turret had been knocked several yards off the enemy tanks.

There is, of course, the horrid battlefield smell of death about the place where dead animals lie unburied in the fields. Occasionally one passes a few pitiful heaps with crude wooden crosses in the corners of the fields. These are the first graves of the soldiers; they will be reinterred

THE CRUISE OF THE "GALLOPING GREMLIN"

later in organised cemeteries. Somehow one feels they are not dead but are just acting a part in this fantastic drama where thousands of men are hypnotised into believing that war is necessary.

By the side of the road small groups of Italian soldiers and refugees plod wearily along with heavy burdens and very little in the way of footgear. The women, who work so hard in Italy, have stark tragedy written across their faces. Truly they were fed on the "glories of war" for twenty years and are now reaping its misery. With all the wretchedness of bombing with which this country has had to contend, we must be eternally grateful that we have never suffered the fate of refugees.

The Beaches

The Salerno beaches are a fantastic sight. Ships of all shapes and sizes lie at anchor under a balloon barrage which, seen from the air, looks like a row of pearls set in ultramarine. The amphibious lorries—Ducks—run down the sand into the water and, changing over to screw propulsion, run out to some transport to be loaded-up while lying alongside. As each one is filled it returns to the shore and waddles up the beach again, following the one-way traffic under the direction of military policemen.

Huge landing craft line the water's edge with their front ramps let down and lorries back-on to load and drive straight off as soon as they are filled. Air superiority is so great that only one in a hundred of the troops wears a steel helmet. Even the Italians hang around in ragged groups hoping to be engaged as labourers or at least to pick up some soldier's discarded rations.

We were now on what was to have been our furthest forward landing, but when the time came to leave for Sicily the radio operator did not know the "colour of the day," and naturally it could not be obtained over the telephone. So we had the joy of flying into Montecorvino airfield—which was then about three minutes' flying from the front line—in an unarmed machine and without the recognition signal.

During the brief wait there, other Dakotas were arriving to pick up urgent wounded cases to be flown to base hospitals. The ubiquitous Spitfires were also there, taking off in pairs. Although the surroundings were unfamiliar, the beloved "Spit" was just the same—the right leg tucking up just a few seconds before the left.

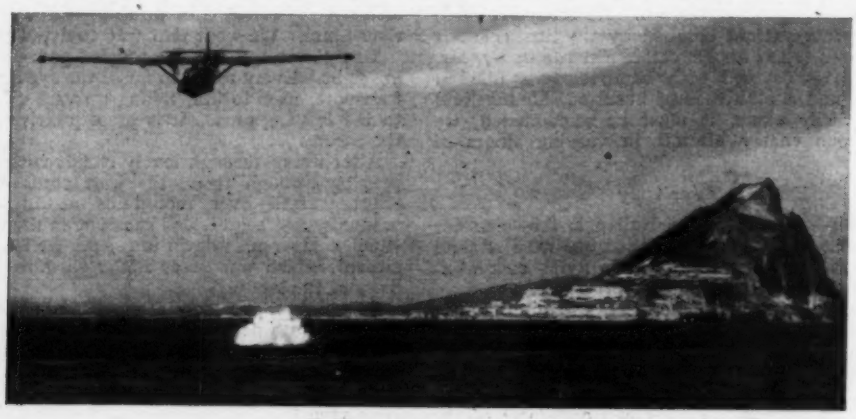
On board the "Galloping Gremlin" again, we took our last look at the beaches and followed the coast southward. Stromboli appeared to starboard, but, like Etna, it refused to perform for us. Back over the Straits of Messina where, on the night before the invasion, 1,100 guns were ranged, we passed over a convoy of landing barges.

Syracuse we reached in time to have an al fresco lunch in an almond and lemon orchard, after which we left for Malta.

The route we took from this airfield must have been the same as that traversed hundreds of times by Axis airmen during the days of Malta's tribulation. Malta is knocked about, of that there is no doubt, but anyone who has seen the devastation in London would not be shocked at what he would see in Malta. It did, however, have a very close escape from being starved-out, which was much more serious than the bombing.

Of the return journey along the North African coast there is little to relate that was different from the outward journey. At Algiers we took leave of the "Galloping Gremlin" and its crew with many regrets. Boarding yet another Dakota we flew non-stop from Algiers to Rabat, this time going through the Straits of Gibraltar because of electric storms inland. It would have been as well to have dropped us at the Rock, since we came on to Gibraltar the next day before leaving there later for Britain in the darkness.

The final stages were rather impressive, even to one who has just completed 30 years' flying. Lunch in West Africa, tea and dinner in Gibraltar, breakfast in Britain. And Britain looked very lovely, too.



ATLANTIC FERRY PIONEERS

THE statement recently issued by the Air Ministry that to September 30 the percentage of loss on the Atlantic Ferry Service has been less than half of 1 per cent. recalls that an Australian, Air Comdre. D. C. T. Bennett, C.B.E., D.S.O., R.A.F., of Brisbane, was among those who founded the ferry service.

Bennett and his associates used Montreal as headquarters and obtained pilots and radio operators from British Overseas Airways to form the original nucleus. The organisation, at first known as Atfero, was taken over by the Royal Air Force.

Wing Cdr. Bennett (as he then was) led the first flight when the service was inaugurated on the night of November 10th, 1940. Seven Hudsons manned by personnel from Britain, Australia, South Africa, Norway, Canada and the United States took off that dark, freezing night. At 20,000 feet Bennett's formation still flew in heavy snow and turbulence, but although formation had to be broken and each aircraft make its way individually, all arrived safely.

So the Service began. Later, Service navigators trained under the Empire Air Training Scheme became available. On January 9th, 1942, two members of the R.A.A.F. and a member of the R.C.A.F., who are believed to have been the first crew entirely trained under the E.A.T.S., created a trans-atlantic record. They were P/O. R. A. Stevenson, of Sydney, navigator; P/O. George V. Syer, pilot (an English member of the R.A.A.F. who trained in Australia) and P/O. A. Harris, of Canada. (Syer, incidentally, is now an R.A.F. padre). They covered the journey, in temperatures as low as minus 35 deg. Centigrade, in 7 hours 40 minutes—30 minutes better than the previous record set up by a Liberator.

To-day Air Comdre. Bennett is engaged in work of equal importance in another sphere of air operations.

The "big cigar" 45-gallon supplementary fuel tanks used on the veteran Hurricane are supported from streamlined fairings outboard of the centre section. The increased range provided makes the offensive potential of this seven-year-old an additional headache for its adversaries

Drop Tanks

Supplementary Fuel has Greatly Extended Range of Aircraft: Features of Different Installations in Use

SUPPLEMENTARY fuel tanks which can be jettisoned after use or in an extreme emergency are becoming a familiar feature of an increasing number of aircraft types. The drop tank is a very useful method of obtaining greatly increased effective range without reducing to a serious degree other aspects of operational performance. The increase in drag and load necessarily implied in carrying external drop tanks is a very small quantity when compared with the tremendous increase in range, which in some cases amounts to approximately double that of the normal aircraft.

In addition to tactical employment, as for instance extended fighter cover for long-range bombers, the increased range can be used for ferrying purposes, and from this consideration alone forms an important contribution, more especially as the distance from the constructional centres to the operational bases is steadily increasing.

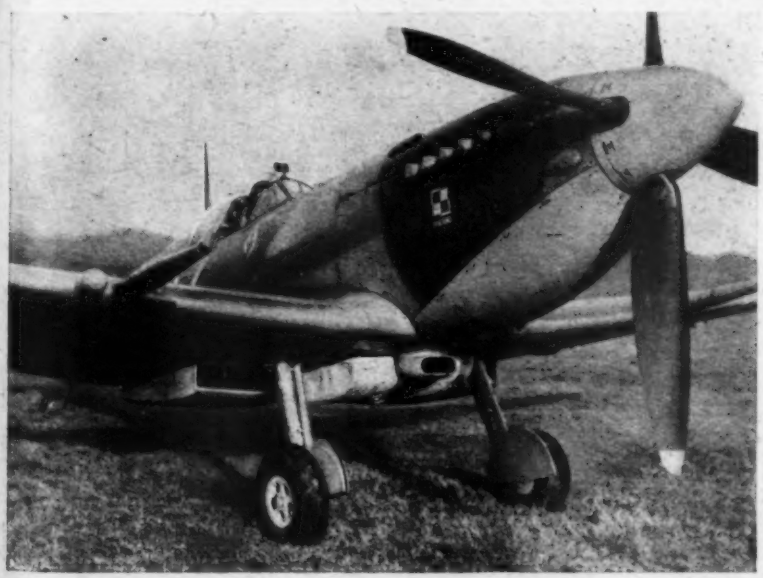
Among aircraft types making use of supplementary tanks are the Spitfire, Hurricane, Typhoon, Thunderbolt, Mustang, Mosquito and Lightning. More recently it has further been mentioned that Fortress and Liberator bombers can be fitted with what are characteristically known as "Tokyo Tanks" to enable them to reach the yellow heart or alternatively any other distant but desirable target.

Metal, Wood and Paper

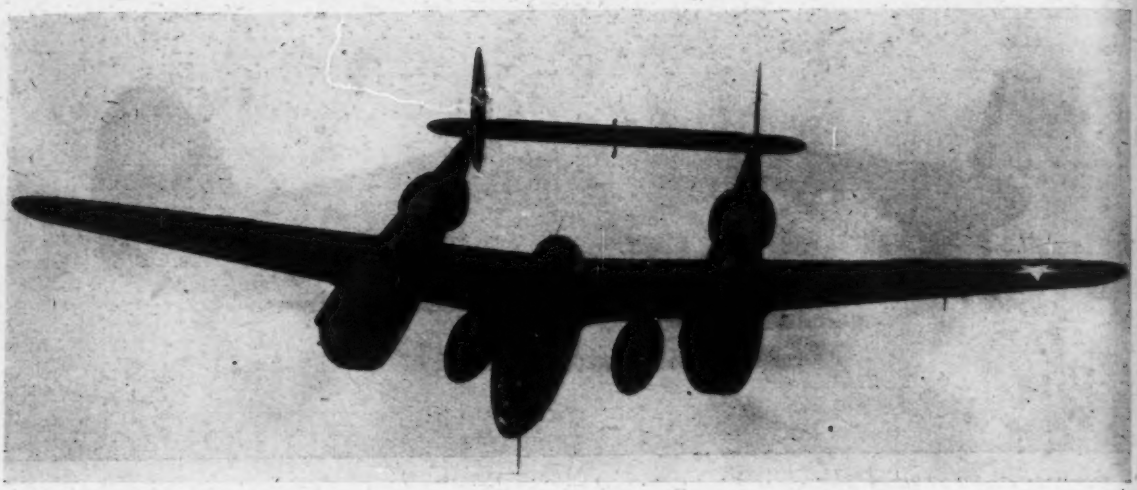
The various types of tank employed differ for individual aircraft, both in capacity and construction, and since research is still going on, it is not unusual to find aircraft of the same type using different kinds of tanks, although in this connection the result required governs the necessary capacity and therefore the particular tank employed.

Although metal is the more usual material, some types of drop tanks are constructed of non-critical materials such as bonded plywood and an improved form of processed *papier mâché*. Interesting experiments have also been carried out with Pytram tanks, an article on which appeared in the August issue of our associated journal *Aircraft Production*.

Pytram is a material consisting of cellulose-fibre laminations bonded together with special non-resinous adhesives. The laminations in strip form are built up on wooden or plaster moulds by a technique somewhat similar to that used in moulded plywood construction, the properties of



The neat little slipper tanks which allow the familiar "Spit" to forage over wider fields are carried snugly beneath the fuselage



Each of these "eggs" contains 150 gallons of nourishment for the Lightning, the sustenance approximately doubling the effective range at a negligible performance cost.

DROP TANKS

the finished material being of an extremely high order.

To provide extended fighter cover and to increase the time limit on operational sorties, the Hurricane and Typhoon fighters have fitted beneath each wing a 45-gallon metal drop tank, each approximately 7ft. long by 15in. diameter and weighing 29 lb. empty.

Drop tanks are also being manufactured in the United States by licensees of the Vidal Research Corporation. The tanks are of a conventional streamlined shape and are constructed entirely of plastic-bonded plywood. The shell is made in the thinnest possible section which will carry the weight of fuel, and the special patterning of veneers provides a leakproof construction. Bracing and anti-surge bulkhead are, of course, incorporated, and the various makers are planning to produce a range of sizes from 50 gallons to 160 gallons capacity.

Thunderbolts Visit Emden

Republic P.47 Thunderbolt fighters accompanied Flying Fortresses throughout a recent raid on Emden, which in straight flight is a distance of approximately 320 miles. The Thunderbolts were able to make the round trip of 640-odd miles purely because they were fitted with belly drop tanks.

The procedure is for the aircraft to start the trip on the supplementary tanks, jettison them when exhausted, transfer to fuel feed from main tanks and complete the run home.

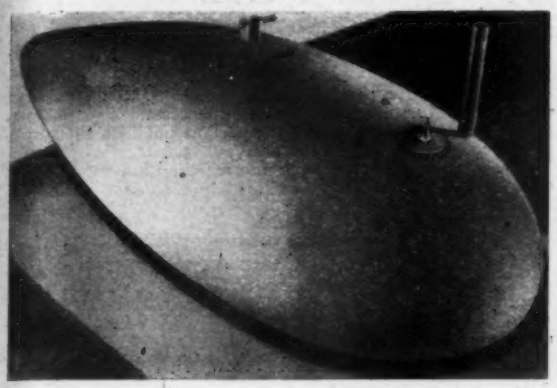
These fighters are using two types of drop tank, a metal one made in the United States, and a processed *papier mâché* type made in this country.

The Lockheed Lightning, which has two of almost everything except seats, continues on those lines by having two drop tanks, each fitted beneath the centre section between fuselage and nacelles. These tanks are constructed of 23 S.W.G. (0.024in.) sheet steel; they have a capacity of 150 gallons

(Centre, right) This illustration shows the recent appearance of the latest German drop tank fashion complete with tail fins.

(Right) The heaviest single-seater fighter in the world carries a bulbous drop tank slung beneath its belly.

DROP TANKS



The Vidal tank, which is constructed entirely of plastic-bonded plywood of the smallest practicable thickness, is being manufactured in the United States.

The D.H. Mosquito carries beautifully formed drop tanks immediately beneath the underside of the wings outboard of the nacelles.

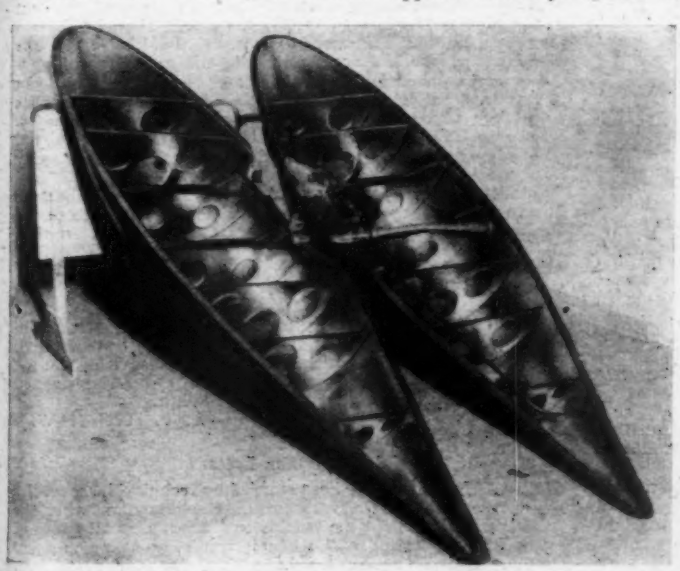
each and weigh 90 lb. empty. Lockheeds took a great deal of trouble to ensure that, having to cope with an extra 300 gallons of fuel and the additional drag of the tanks, the performance of the Lightning should be reduced as little as possible. Their pains were justified by the announced result of a reduction in speed of only 4 per cent.

The Lightning tanks are 10ft. long by 27in. maximum cross-sectional diameter, and are made up in two half-shell pressings, seam-welded together. Seven transverse bulkheads are welded-in, and the attachment points for connection to the aircraft are in a recessed trough on the top curvature of the tanks.

The Pytram tank, intended for interchangeable fitting beneath the wings of Hurricanes and Typhoons.

It is stated that equipping the Lightning with an extra 300 gallons of fuel by this method has resulted in an approximate doubling of its already very useful range.

The range of the Messerschmitt 110 is estimated to be increased from 680 miles to somewhere in the region of 1,200 miles by the use of wing drop tanks, as shown in an illustration. This form of tank appears basically similar, both as to size and shape, to those used on the Lightning, except that the German variety is fitted with tail fins. The precise reason for this unusual addition is not clear, but it appears probable that they have been found necessary to prevent the tanks colliding with the aircraft when jettisoned. This hypothesis is supported by a patent taken out by the Junkers concern in 1939 for a padded or protected drop tank, the reason advanced being the necessity of guarding the aircraft structure against damage on release.



Halves of a Lightning drop tank prior to being welded together, showing the transverse stiffening and anti-surge baffles.

P.R.U. Distances

The work of the R.A.F. Photographical Reconnaissance Units gives an interesting aspect of what an increase in the operational range of aircraft can actually mean. The Spitfire, which nominally has a range of something like 400 miles, has, by the provision of supplementary fuel tanks, been enabled to bring back photographs from such distant places as Norway, Königsberg, Danzig and Gdynia. The range of the D.H. Mosquito has also been extended in a like manner so that pilots of these aircraft have made flights from Scotland to Russia and back between breakfast and dinner. Some time ago a pilot flew from this country to Tunis, photographing Italian ports and airfields on the way, refuelled, had lunch and returned to England by early evening.

These instances, which are by no means exceptional from a routine viewpoint, indicate clearly just one particular way in which the extension of aircraft ranges occasioned by a supplementary fuel supply can be utilised. In addition, as indicated by Fortress and Liberator "Tokyo Tanks," the application is not confined to "small" machines.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THEORY OF FLIGHT

A Question Still Unanswered

I FIND that a reply is necessary to Mr. Hick's rejoinder to my letter in *Flight* of September 16th.

I hardly think that the criticism levelled by Mr. Hick against R.A.F. instruction is justified. The analogy which he has used seems particularly ill-chosen. A booklet of instructions for a car does not give methods for pushing the car home when it has run out of petrol. Mr. Hick has agreed that weight does not substantially affect the gliding angle of an aircraft—that is the bone of contention!

But, in my turn, I cannot agree that variations of wind speed and direction in any way affect the choice of a gliding speed. To alter the gliding speed necessarily means an increase or decrease in the angle of attack. Any variation in the angle of attack from that which gives the optimum glide angle results in a steeper angle of glide.

In other words, the distance covered in the time taken to descend from a certain height is less. Wind effect does not enter into the question—nor into the question of flaps.

Mr. Hick glibly dismisses my question by saying: "In a head wind hang on to weight; in a tail wind throw everything overboard." But he can produce no data to substantiate his statement. It would appear that he has completely missed the significance of the question.

What I want to know is, "Does jettisoning equipment increase the distance an aircraft can glide?"

"PILOT, R.A.F."

BOMBER ARMAMENT

Why Not Four-engined Fighters?

MUCH discussion has been going on lately regarding the comparable merits of 0.303in. and 0.5in. machine guns. It is, of course, generally agreed that the primary function of a bomber is to bomb and not fight, but as fighter escort cannot be given farther than the Low Countries, a bomber attacking a target deep in Germany, either by day or night, must necessarily be able to defend itself, hence the need for guns. A 0.303in. machine gun has, I believe, a range of some 600 yards, a 0.5in. machine gun 750 yards, and a 20 mm. cannon 1,000 yards, the last named having the additional advantage of being an explosive missile.

The success of the German fighter defence is undoubtedly the fact that they use their cannon at ranges between 600 and 1,000 yards and thus contrive to keep outside the range of our bombers' machine guns. I venture to suggest that our losses could be much lighter indeed if our bombers were similarly armed with a multiplicity of 20 mm. cannons, and if we could overcome the fighter opposition the losses from ack-ack fire would be negligible.

My solution to this problem, therefore, although at first sight startling, would be to use a certain number of bombers, either Stirlings by night or Fortresses by day, as fighters. The true bombers, then, need carry no turrets, guns, or ammunition, and the appreciable saving in weight would increase the bomb-load to over 10 tons in the case of Fortresses, and even more in the case of R.A.F. "heavies." They would fly in close formation and would be surrounded by more Fortresses by day, or Stirlings by night, as the case may be, which would carry no bombs at all, but would be fairly bristling with 20 mm. cannons in some form of heavy turrets with recoil mechanism, and which, being relieved of the necessity of carrying any bomb-load at all, could carry a formidable weight of ammunition.

With a close formation of true bombers surrounded by these heavy fighters with their normal petrol tanks, full fighter protection could easily be given to Berlin and back, and any German fighters, either by day or night, that attempted to pick a quarrel with such a flight would get a very formidable fire-power indeed.

If such a formation went to selected targets in Germany, such as the Fw assembly plant at Marienburg or the ball bearing works at Schweinfurt, they could fly at roof-top height and thus confuse the A.A. gunners to a considerable extent.

I venture to suggest that these tactics could enable the most devastating raid to be made on any particular target in Germany with vastly fewer casualties than the 60 Fortresses lost at Schweinfurt.

One might argue that these heavyweight fighters would not be manœuvrable, but it is a question whether long range plus terrific fire-power are not more important qualities than those of all-out speed and manœuvrability.

I should be interested to see any reasoned arguments, technical or otherwise, against the feasibility of this project.

"PERSPEX."

Specialisation v. Adaptability

I HAVE been interested to read the three letters in your issue of October 14th regarding bomber armament, and I should like to make the following observations.

I have no information as to whether Mr. Poshefko's statement to the effect that British Ordnance Officers were too ignorant to use the 0.5-inch machine gun at Singapore is true, but I have no doubt as to their being as capable of tackling their jobs as are their American counterparts. I am aware that the Americans have specialised in high-level bombing, and that this policy has caught the Germans napping, but it now seems that the answer to this form of attack is slowly but surely being found. The good faith of the crews engaged in these attacks is not for one moment in question, but the figures quoted for German fighters shot down sound too good to be true. Mr. Poshefko remarks that American aircraft are built for special purposes, but surely it is much to be preferred to have a few types in production, which can readily be adapted to the changing needs of aerial warfare, rather than a multitude of aircraft suitable for one purpose alone.

Mr. W. B. Richardson makes some excellent points with which I am in entire agreement, but I cannot but feel that two 0.5in. and two 0.303in. machine guns are too heavy for our present turrets. Until further development makes this practical I would suggest that one 0.5in. and two 0.303in. guns will have to suffice.

As regards the letter from Mr. J. Bamsey, I am well aware that our bombers have been designed for bombing, and this point has been made in several other letters on the subject, but in aeronautics improvement in one matter almost always involves sacrifice in some other direction, and it is an indisputable fact that if more guns are fitted fewer bombs can be accommodated. This brings out an important topic not previously mentioned in this correspondence. Bomber Command endeavours to concentrate its attacks into as short a time as possible; for instance, in the raids on Hamburg a month or two ago 2,300 tons were dropped in 50 minutes, while the next night the same weight went down in 45 minutes. The cut in the time taken received special mention in the official communiques, no doubt because it is realised that the greater the concentration the less opportunity the defences have of combating the damage inflicted. This fact is a strong argument in favour of the lightly armed bomber, but it does seem that a tail gun turret armament of one 0.5in. and two 0.303in. guns would be much more effective than the four 0.303in. guns at present used as standard in the tails of our heavy bombers.

Admittedly the Sperry bomb sight is very accurate, but the human element has always to be considered, and much of the accuracy of bombing will always remain dependent on this. If the low losses of Mosquitoes and Typhoons are due to their speed and manœuvrability, why not make increasing use of them—they have proved themselves to be most formidable weapons.

Recent reports of bombing raids emphasise the fact that increasing numbers of night fighters are being encountered, especially when flares are used to light our bombers' path. It is also reported that even the Dornier Do 217 is being pressed into service by the *Luftwaffe* for night fighting.

A. T. HENSHAW.

From Other Letters

SEVERAL readers have been worried by technical inaccuracies in the Sunday Press recently. One wonders why the Americans should take the trouble to "inject a small spray of water into the cylinders," when it can be done much more simply. Others express the hope that the four 7,000 h.p. engines which will be needed for the Short-Saro flying boat of 150 tons will be available, the alternative being 14 engines of 2,000 h.p. each!

Mitchells of the Royal Dutch Navy, on operational duties with the R.A.F., taxi to the runway for take-off.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Promotion

Air Comdre. S. P. SIMPSON, C.B.E., M.C., Air Officer Commanding, R.A.F. Station, Gibraltar, to be Act. Air Vice-Marshal.

Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy :—

Distinguished Service Order

Act. Wing Cdr. J. BLACKBURN, D.F.C., R.A.F.O., No. 148 Sqn.—Since he was appointed to command this squadron, Wing Cdr. Blackburn has completed 300 hours operational flying, nearly all of which have been at night. His sorties have involved very long flights over difficult and mountainous country, when he has displayed skill, endurance and courage of a high order.

Act. Sqn. Ldr. J. B. STARKY, D.F.C., R.N.Z.A.F., No. 115 Sqn.—One night in September, 1943, F/O. Beer and Sgts. Tugwell and Willis were air bomber, mid-upper gunner and rear gunner respectively of an aircraft captained by Sqn. Ldr. Starkey and detailed to attack Mannheim. When nearing the target area the aircraft was attacked by a fighter. The bomber was badly hit and sustained much damage. It became filled with smoke and dived earthwards out of control. By a tremendous effort, Sqn. Ldr. Starky succeeded in regaining control as the fighter came in to resume the attack. Sgts. Tugwell and Willis coolly withheld their fire until the attacker came into close range, then, with devastating bursts of fire, shot it down in flames. The situation was critical as the bomber had been badly crippled, while the second pilot and flight engineer had been wounded. Nevertheless, on a course plotted by F/O. Beer, who throughout the remainder of the homeward flight rendered great assistance, Sqn. Ldr. Starky battled his way over enemy territory, often under fire from ground defences. Displaying superb airmanship and an unconquerable spirit he finally reached an airfield near the coast and effected a safe landing.

Act. Sqn. Ldr. W. STERNE, R.A.F.V.R., No. 283 Sqn.—In air/sea rescue operations this officer has rendered most valuable service. During one period of six weeks the squadron he commands were responsible for the rescue of many members of aircraft crews from the sea around Pantellaria and Sicily. These efforts were made under the supervision and direction of Sqn. Ldr. Sterne, who himself effected several of them, involving abnormal hazard, near enemy territory. In June, 1943, he undertook a search for a pilot reported adrift in a dinghy. After many hours flying, Sqn. Ldr. Sterne located the dinghy very close to the Sicilian coast. The sea was extremely rough, but in circumstances which called for the utmost skill, Sqn. Ldr. Sterne effected a successful rescue. This officer has displayed outstanding leadership and great courage.

Act. Wing Cdr. J. H. PLAYER, D.F.C., R.A.F.O., No. 255 Sqn.—During December, 1942, Wing Cdr. Player was in charge of an advanced detachment which at the time had practically no ground crews. Although a large part of the maintenance work had to be done by the pilots themselves, under his excellent leadership the detachment succeeded in destroying 16 enemy aircraft in 15 days. In March, 1943, this officer was largely instrumental in organising intruder operations over Sardinia, frequently participating in sorties personally. Under his command the squadron has destroyed 15 enemy aircraft and damaged many more.

Act. Sqn. Ldr. J. MORGAN, R.A.F.V.R., No. 682 Sqn.—Since his arrival in North Africa this officer has completed many exceptionally successful sorties over targets in all parts of Italy and Southern France. In July, 1943, he was appointed to command the squadron and in this capacity has set a fine example by the keenness and courage which he has displayed in all his missions.

Act. Wing Cdr. D. F. SPOTSWOOD, D.F.C., R.A.F.O., No. 500 Sqn.—While in command of No. 500 Sqn., despite heavy administrative responsibilities, Wing Cdr. Spotswood personally participated in several successful attacks on U-boats. By his personal example, both in the air and on the ground, he built up an excellent squadron.

Second Bar to Distinguished Flying Cross

Act. Sqn. Ldr. F. D. HUGHES, D.F.C., R.A.F.V.R., No. 600 Sqn.—Sqn. Ldr. Hughes is a brilliant night fighter whose determined efforts have met with further successes. Since being awarded a bar to the Distinguished Flying Cross he has destroyed seven enemy aircraft. His total victories number at least 16, of which 13 have been destroyed at night.

Act. Sqn. Ldr. G. U. HILL, D.F.C., R.C.A.F., No. 111 Sqn.—Sqn. Ldr. Hill, as a fighter pilot, has displayed exceptional courage and determination. He has destroyed at least 14 enemy aircraft, including one by night, and damaged many others. During recent operations from Malta, he led his squadron with skill and resolution, personally destroying four enemy aircraft within a few days. On one occasion he remained alone, despite repeated and persistent attacks from six Messerschmitts 109s, to obtain assistance for a comrade who had been forced to leave his aircraft by parachute.

Air Marshal Sir Trafford Leigh Mallory, A.O.C.-in-C. Fighter Command, decorating Col. H. Zemke of the U.S.A.A.F. with the D.F.C. Col. Zemke commands a Thunderbolt group.

Bar to Distinguished Flying Cross

Act. Wing Cdr. J. R. WHELAN, D.F.C., R.A.F.O., No. 680 Sqn.—Wing Cdr. Whelan has commanded his squadron since May, 1942, and has completed many long-distance reconnaissance sorties over the sea and enemy territory. Recently he successfully completed a mission at the extreme range of his aircraft which thereby required precise flying and most accurate photography.

F/O. L. DIXON, D.F.C., R.A.F.V.R., No. 600 Sqn.—F/O. Dixon is an extremely skilful observer who has assisted in the destruction of at least 10 enemy aircraft at night. He has at all times displayed great zeal and has proved himself to be a most valuable member of aircraft crew.

Act. Sqn. Ldr. W. C. KLASSEN, D.F.C., R.C.A.F., No. 424 (R.C.A.F.) Sqn.—Since being awarded the Distinguished Flying Cross this officer has continued to display outstanding powers of leadership. On every occasion he has chosen the most difficult and hazardous work. His great personal courage has had an excellent effect on the squadron during an extremely difficult period.

Act. Sqn. Ldr. D. L. MATTHEWMAN, D.F.C., R.A.F.V.R., No. 142 Sqn.—This officer is now on his second tour of operational duty, and has proved himself to be an outstanding flight com

SERVICE AVIATION

mander and leader. During his work with this squadron he has set a fine example of bravery in the face of the enemy, and has at all times completed his bombing raids with gallantry and enthusiasm.

Act. Flt. Lt. E. R. BAKER, D.F.C., R.A.F.O., No. 262 Sqn.—In August, 1943, this officer bombed and sank an enemy E-boat, and on the same sortie destroyed a Heinkel III near the Channel Islands. Later in August his squadron, under his leadership, destroyed five E-boats and one armed trawler. During his present and third tour of operations, Flt. Lt. Baker has participated in numerous bombing sorties as Sqn. or Flt. Cdr., and has destroyed several trains. In May, 1943, he was wounded when his aircraft sustained severe damage from antiAircraft fire.

Distinguished Flying Cross

F/O. B. A. W. BEES, R.A.F.V.R., No. 115 Sqn. For citation see Sqn. Ldr. Starky, D.S.O., D.F.C.

Wing Cdr. W. A. L. DAVIS, R.A.F.

Act. Sqn. Ldr. P. H. HUMPHREYS, R.A.F.V.R., No. 92 Sqn.

Flt. Lt. R. F. HAYES, R.A.F.V.R., No. 284 Sqn.

Act. Flt. Lt. M. MORLEY, R.A.F.V.R., No. 224 Sqn.

F/O. E. T. BATCHELOR, R.C.A.F., No. 224 Sqn.

W/O. R. W. LOWE, R.A.F.V.R., No. 224 Sqn.

P/O. R. H. PROBERT (R.C.A.F.), No. 92 Sqn.

W/O. K. G. HALL, R.A.F.V.R., No. 284 Sqn.

F/O. W. E. ARMSTRONG, R.A.F.V.R., No. 600 Sqn.

F/O. R. M. CRONCHEY, R.A.F.V.R., No. 37 Sqn.

Flt. Lt. K. A. FAULKNER, R.A.F.V.R., No. 252 Sqn.

F/O. W. LESTER, R.A.F.V.R., No. 40 Sqn.

Act. Flt. Lt. J. C. H. DELISLE, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

F/O. H. T. BROWN, R.C.A.F., No. 419 (R.C.A.F.) Sqn.

F/O. S. T. SMITH, R.C.A.F., No. 90 Sqn.

P/O. J. MCGUBBIN, R.A.F.V.R., No. 9 Sqn.

Act. Flt. Lt. W. S. DAY, R.C.A.F., No. 90 Sqn.

Flt. Lt. R. B. COLE, R.A.F.V.R., No. 250 Sqn.

Flt. Lt. L. O. BARNETT, R.A.F.V.R., No. 259 Sqn.

F/O. C. E. ROBIN, R.C.A.F., No. 265 Sqn.

Act. Flt. Lt. M. S. HARDS, D.F.M., R.A.F., No. 92 Sqn.

Act. Flt. Lt. T. LAWLOR, R.A.F.V.R., No. 40 Sqn.

Act. Flt. Lt. B. H. THOMAS, R.N.Z.A.F., No. 260 Sqn.

Act. Flt. Lt. R. THOMSON, R.A.F.V.R., No. 154 Sqn.

F/O. E. J. SHAW, R.N.Z.A.F., No. 72 Sqn.

Sqn. Ldr. M. L. F. BEYTAGH, R.A.F.O., No. 602 Sqn.

Sqn. Ldr. R. T. P. DAVIDSON, R.A.F.O., No. 81 Sqn.

Act. Sqn. Ldr. W. HOY, R.A.F., No. 604 Sqn.

Act. Sqn. Ldr. H. LAW-WRIGHT, R.A.F.V.R., No. 14 Sqn.

Flt. Lt. J. S. MCCRAE, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

Act. Flt. Lt. C. M. BLAKENEY, R.A.F.V.R., No. 425 (R.C.A.F.) Sqn.

Act. Flt. Lt. M. F. DEKYVERE, R.A.A.F., No. 277 Sqn.

Act. Flt. Lt. W. T. HAWKINS, R.N.Z.A.F., No. 613 Sqn.

Act. Flt. Lt. R. T. HUTCHINSON, R.C.A.F., No. 414 (R.C.A.F.) Sqn.

Act. Flt. Lt. A. MITCHELL, R.A.F.V.R., No. 140 Sqn.

Act. Flt. Lt. J. R. PUGH, R.A.F.V.R., No. 500 Sqn.

Act. Flt. Lt. H. W. RADFORD, R.A.A.F., No. 142 Sqn.

Act. Flt. Lt. L. A. WAINWRIGHT, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

F/O. W. K. BRANCH, R.A.F., No. 107 Sqn.

F/O. L. N. BROWN, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

F/O. P. J. R. FLYNN, R.A.F.V.R.

F/O. E. W. FORWELL, R.A.F.V.R., No. 140 Sqn.

F/O. D. HACKETT, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

F/O. J. A. ROUND, R.A.F.V.R., No. 91 Sqn.

F/O. J. A. STEWART, R.A.F.V.R.

F/O. E. M. WATSON-SMYTH, R.A.F.V.R., No. 150 Sqn.

P/O. A. T. BIECH, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

P/O. L. COPENHAVER, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

P/O. G. W. DUFFIELD, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

P/O. L. T. GARLAND, R.A.F.V.R., No. 39 Sqn.

P/O. C. W. PADDOCK, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

P/O. G. A. SOUCH, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

P/O. R. A. STUTT, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

P/O. L. G. WILSON, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

P/O. W. J. YOUNG, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

W/O. A. H. THOMPSON, R.A.F.V.R., No. 47 Sqn.

Distinguished Flying Medal

Sgt. K. W. J. TUGWELL, R.A.F.V.R., and Sgt. H. J. WILLIS, both of No. 115 Sqn. For citation see Sqn. Ldr. Starky, D.S.O., D.F.C.

Flt. Sgt. B. C. MCMURTIE, R.A.A.F., No. 224 Sqn.

Flt. Sgt. H. A. CLIFFORD, R.A.F.V.R., No. 236 Sqn.

Sgt. J. ALDERDICE, R.A.F.V.R., No. 51 Sqn.

Sgt. W. HUGHES, R.A.F.V.R., No. 102 Sqn.

Sgt. D. L. JONES, R.A.F.V.R., No. 51 Sqn.

Sgt. D. J. LUNN, R.A.F., No. 284 Sqn.

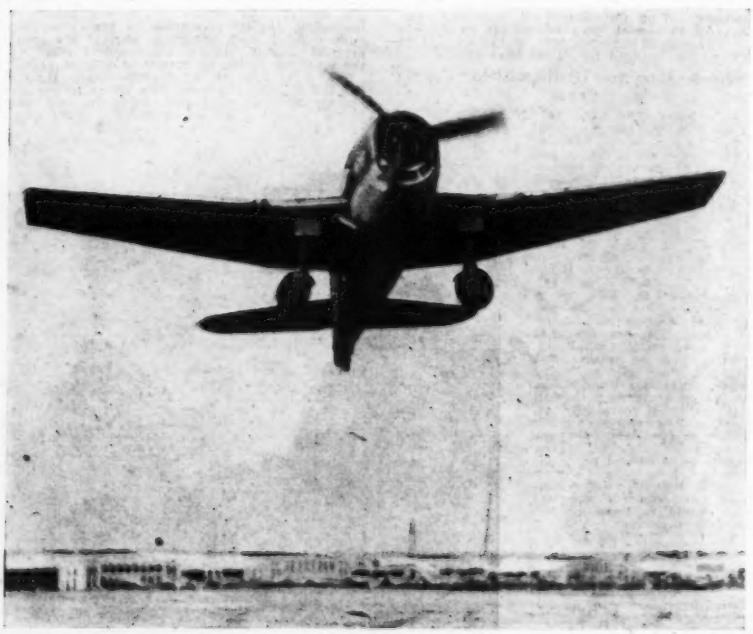
Sgt. L. R. WRIGHT, R.A.F.V.R., No. 156 Sqn.

Sgt. G. V. GOODES, R.A.F.V.R., No. 252 Sqn.

Flt. Sgt. R. F. LAVACK, R.A.F.V.R., No. 37 Sqn.

Flt. Sgt. H. B. MARSHALL, R.A.F.V.R., No. 158 Sqn.

Sgt. A. J. SARGEANT, R.A.F.V.R., No. 106 Sqn.



F.A.A.'s. NEW FIGHTER: The Grumman Hellcat, now in service with the Royal Navy. The Hellcat is a development of the Wildcat which is a modified version of the Martlet.

Flt. Sgt. C. A. MITCHINSON, R.A.A.F., No. 90 Sqn.

Sgt. J. N. S. ASHTON, R.A.F.V.R., No. 419 (R.C.A.F.) Sqn.

Sgt. N. L. E. GALE, R.A.F.V.R., No. 106 Sqn.

Sgt. W. S. LAMBERT, R.A.F.V.R., No. 283 Sqn.

Sgt. K. V. S. CALIGARI, R.A.F., No. 259 Sqn.

Sgt. H. M. BERVEN, R.C.A.F., No. 40 Sqn.

Sgt. R. R. DAVEY, R.C.A.F., No. 178 Sqn.

Flt. Sgt. J. F. BAILES, R.N.Z.A.F., No. 150 Sqn.

Flt. Sgt. G. G. GRAHAM, R.A.F.V.R., No. 14 Sqn.

Flt. Sgt. A. R. GRIMSTONE, R.A.F.V.R., No. 85 Sqn.

Flt. Sgt. W. E. LAIDLAW, R.A.F.V.R., No. 142 Sqn.

Flt. Sgt. H. A. MCDONALD, R.A.A.F., No. 150 Sqn.

Flt. Sgt. J. I. SIMPSON, R.A.F.V.R., No. 263 Sqn.

Flt. Sgt. H. B. R. VENNING, R.A.F.V.R., No. 142 Sqn.

Sgt. A. E. BASHFORD, R.A.F.V.R., No. 150 Sqn.

Sgt. J. A. CHRISTIE, R.A.F.V.R., No. 142 Sqn.

Sgt. S. E. FINLAYSON, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

Sgt. C. J. LETT, R.A.F.V.R., No. 150 Sqn.

Sgt. C. A. J. LOCKLEY, R.A.F.V.R., No. 156 Sqn.

Sgt. D. F. G. PARKES, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

Sgt. K. R. PUGH, R.A.F.V.R., No. 283 Sqn.

Sgt. S. RUTHERFORD, R.N.Z.A.F., No. 150 Sqn.

Sgt. P. L. SEVILLE, R.A.F.V.R., No. 150 Sqn.

Sgt. K. SMITH, R.A.F.V.R., No. 150 Sqn.

Sgt. K. E. TINSLEY, R.A.F.V.R., No. 150 Sqn.

Flt. Sgt. J. C. BARTLETT, R.A.A.F., No. 142 Sqn.

Flt. Sgt. J. C. SMIT, S.A.A.F., No. 24 Sqn.

Sgt. R. HARRISON, R.A.F.V.R., No. 150 Sqn.

Sgt. W. HOLMES, R.A.F.V.R., No. 142 Sqn.

Sgt. J. P. LEE, R.C.A.F., No. 150 Sqn.

Sgt. A. MOY, R.A.F.

Sgt. F. G. WILKINSON, R.A.F.V.R., No. 153 Sqn.

Sgt. G. R. WILSON, R.A.A.F., No. 150 Sqn.

Sgt. T. S. WILLIAMS, R.A.F.V.R., No. 101 Sqn.

Sgt. R. G. WILLIAMS, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.

Sgt. J. N. WRIGHT, R.A.F.V.R., No. 432 (R.C.A.F.) Sqn.

Sgt. C. PENNA, R.A.F.V.R., No. 214 Sqn.

Act. Flt. Sgt. T. G. STEPHENS, R.A.F.V.R., No. 156 Sqn.

Roll of Honour

Casualty Communiqué No. 300.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action are due to flying operations against the enemy; "On active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 96 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Sgt. J. W. Burton; P/O. R. E. Chesser; Flt. Sgt. J. R. Coster; Sgt. C. E. Crampton; F/O. J. F. H. Erwin; Sgt. L. P. Fannan; F/O. N. P. Gardner; Flt. Lt. A. C. Griffin; Flt. Lt. C. S. Grossey; Flt. Sgt. J. C. McClinken; Sgt. F. H. Merritt; F/O. D. G. Mitchell; Sgt. G. E. Oliver; Flt. Sgt. N. B. Pickford; Sgt. W. N. Pitts; Sgt. J. Poole; P/O. C. A. H. Silvester; Sgt. G. F. W. Tilt; F/O. G. N. Wilkinson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. R. H. Bambury; Sgt. W. D. Bowen; P/O. R. S. Burgher; Sgt. D. B. Care; Sgt. A. T. Carpenter; Sgt. T. J. Cox; Sgt. G. R. Dickenson; P/O. G. Farmer; Sgt. E. J. Frith; Sgt. G. Henderson; Sgt. A. R. James; Flt. Lt. W. J. R. Kirk; Act. Flt. Lt. D. H. S. Lonsdale; Sgt. N. T. McMaster; F/O. J. E. Mason; F/O. H. L. Meller; Sgt. J. I. Morris; F/O. W. O. Peacock; Sgt. J. Peak; Sgt. A. T. Rilet; P/O. J. R. W. Roe; Sgt. R. C. Saunders; Flt. Sgt. W. E. Smith; Sgt. A. D. Smitherman; Sgt. W. Stewart; Sgt. P. J. Turner; Sgt. J. Wilby.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. N. K. Adams; P/O. W. H. Baker, D.F.C.; Flt. Sgt. W. C. Burr; P/O. P. S. Champion-Jones; Sgt. F. J. Cherry; Sgt. C. L. Davies; Sgt. S. V. Deed; Sgt. H. C. Dent; Sgt. G. W. Dillon; Sgt. J. Donald; Sgt. R. E. Dutton; F/O. W. N. Eales; Sgt. L. F. Eastoe; Sgt. G. Form; F/O. J. Francombe; F/O. G. D. Garrod; Flt. Sgt. P. N. Goalby; P/O. V. N. Gwyer; Sgt. G. Jenninga; Flt. Sgt. G. D. Kirkby; Sgt. C. J. Lee; Sgt. R. S. V. Lewis; A/C.2 L. H. Mallinson; P/O. D. G. Mercer; D.F.C.; Sgt. T. Miller; Sgt. A. Morgan; Act. F/O. E. G. Nichols; Flt. Lt. M. G. Olley; Sgt. J. L. Organ; Sgt. R. S. Otter; F/O. L. Powell; Sgt. A. B. P. Rumsey; F/O. E. H. Scott; Sgt. T. Shepherd; Act. Sqn. Ldr. E. R. Simpson, D.F.M.; P/O. J. D. Smith; F/O. L. W. Sprackling; F/O. I. N. Stein; Sgt. A. W. E. Taylor; W/O. H. Vipond; Sgt. A. H. Wallace; Sgt. J. W. Williams; Sgt. T. L. Williams; Sgt. J. L. Wilson.

WOUNDED OR INJURED IN ACTION.—P/O. A. T. Ellis; P/O. W. J. MacPherson; Sgt. G. G. Marsh; P/O. F. S. Moores.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. C. Ebbage.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. B. E. Adams; Flt. Sgt. J. G. Gourlay; Flt. Sgt. D. C. Neil; Flt. Sgt. E. L. Penington; F/O. A. O. Whapham.

MISSING.—F/O. N. Ashburner; Flt. Sgt. W. H. Austin; Sgt. A. Bain; Sgt. R. Barrass; Flt. Sgt. H. Beaumont; Sgt. H. Bottomley; Act. W/O. K. Breckton, D.F.M.; Act. Sqn. Ldr. P. Bunclark, D.F.C., D.F.M.; Sgt. L. W. Bush; P/O. V. C.

ANOTHER FLEET AIR ARM GRUMMAN: The American torpedo-bomber Avenger which has been renamed the Tarpon by the Royal Navy.

Bye; Sgt. H. Cameron; Sgt. R. E. Chapman; Sgt. N. P. Collins; P/O. E. R. I. Cornell; Sgt. L. A. Cox; P/O. V. Creswell; Act. Sqn. Ldr. J. A. Crompton; Sgt. S. Cugley; Sgt. T. Davison; Sgt. F. W. Day; Sgt. K. T. Dixon; P/O. E. G. Farr; W/O. T. Fear; Sgt. W. S. Frame; Sgt. R. A. Freeman; Flt. Sgt. H. J. French; Sgt. T. J. Gleeson; F/O. A. G. W. Godley; Flt. Sgt. E. Gorbert; Sgt. H. G. Griffiths; Sgt. J. Harwood; Sgt. J. A. Hobbs; Sgt. J. A. Irving; Flt. Sgt. C. W. Jones; P/O. L. R. King, D.F.M.; F/O. H. Laverick; Flt. Sgt. A. E. Lefort; P/O. W. Lester; Sgt. A. Lucas; Sgt. T. J. Lucy; Sqn. Ldr. G. C. Matheson; P/O. E. F. C. Matthews; Flt. Sgt. A. E. May; P/O. J. S. Moore; Sgt. F. T. Morris; Sgt. C. Munro; Sgt. P. J. P. Murphy; Flt. Sgt. A. R. Murray; Sgt. G. W. Payne; Sgt. W. T. Peace; F/O. K. W. Rawlins; P/O. V. A. Robins; Sgt. S. A. Rosenthal; Sgt. B. H. Ruddy; Flt. Sgt. R. G. Shaw; Sgt. D. H. Sherburn; Sgt. A. J. K. Steven; Sgt. J. C. Thomson; Flt. Sgt. H. M. Valentine; F/O. S. R. Vivian; Sgt. W. J. Wearn; Sgt. G. W. Wilson; Sgt. D. G. Woolcott; Sgt. G. Wright.

KILLED ON ACTIVE SERVICE.—P/O. W. W. Adams; Sgt. R. B. Allen; Sgt. P. Baldwin; Sgt. R. W. Ballauff; P/O. F. G. Bell; P/O. A. Beresford; Sgt. R. J. Copeman; Act. Sqn. Ldr. E. A. Costello-Bowen; Flt. Sgt. L. Davies; Flt. Sgt. E. C. Dowling; L.A/C. A. E. Earle; Cpl. E. W. Gillingwater; Sgt. L. H. W. Green; Sgt. R. W. Hughes; Flt. Sgt. J. Hyde; F/O. F. G. Ingham; Cpl. F. R. Magson; Sgt. L. Marshall; Sgt. R. S. Moncrieff; Sgt. R. S. Naylor; Sgt. N. A. J. Ovenden; P/O. G. Rogers; Flt. Lt. J. C. Smith; Sgt. A. D. Stafford; Sgt. E. R. E. Thomas; Sgt. E. Townsend; L.A/C. V. G. Windsor.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. J. L. Ball; Sgt. W. G. Duff; Sgt. C. H. M. Foster; A/C.2 P. L. Foster; Flt. Sgt. G. W. Hankins; Sgt. L. F. Instone; F/O. J. D. H. Pearson; L.A/C. V. H. Skinner; Sgt. J. A. W. Taylor.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. D. R. Birt; L.A/C. E. Oliver; Sgt. G. Rumble.

DIED ON ACTIVE SERVICE.—W/O. C. Allen; A/C.2 J. C. Docherty; L.A/C. J. H. F. Eland; L.A/C. T. Fox; Cpl. D. E. Gibson; L.A/C. J. McEwan; A/C.2 J. L. H. MacMurray; L.A/C. S. G. Marks; A/C.1 W. A. G. Mulligan; L.A/C. L. C. Noble; A/C.2 L. J. Reed.

Women's Auxiliary Air Force

WOUNDED OR INJURED ON ACTIVE SERVICE.—Cpl. E. A. Ratcliffe.

DIED ON ACTIVE SERVICE.—Cpl. L. Thorpe.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. W. M. Arnold; P/O. A. N. Austin; Sgt. T. L. F. Bailey; Sgt. R. W. Paradise; P/O. C. H. Phillips.

MISSING, BELIEVED KILLED IN ACTION.—P/O. J. M. Fischer; P/O. L. McKay; Sgt. R. G. Spencer.

MISSING.—Sgt. G. A. French; P/O. L. G. Harris; Sgt. G. W. Ward.

KILLED ON ACTIVE SERVICE.—F/O. S. C. B. Abbott, D.F.C.; F/O. C. T. Enright; Flt. Sgt. F. H. Morphett; Sgt. E. C. Thompson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. F. J. Matthews.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. O. A. Bettridge.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. J. A. Arbuckle; Act. W/O. T. B. Barnhill; Sgt. M. A. Harper; Sgt. E. G. Lacina; Sgt. L. J. Lafleur; Sgt. R. G. MacDonald.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. C. J. Eggleton; Sgt. F. J. Gallagher; P/O. G. H. Kelly; Sgt. A. Mortimer; P/O. A. J. Parkyn; Act. Flt. Lt. V. F. Patterson; Flt. Sgt. J. V. Rounsefell; W/O. C. N. Valequet.

WOUNDED OR INJURED IN ACTION.—P/O. J. Grudzien.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. W. H. Davey.

MISSING.—Sqn. Ldr. W. H. Baldwin, D.F.C.; F/O. W. G. H. Baum; P/O. W. Bray; P/O. L. G. E. Burnett; P/O. J. G. Castle; Sgt. A. Davidson; F/O. R. C. Day; P/O. D. C. D. Dubouloy; Sgt. G. W. Fraser; F/O. A. J. Gibson; F/O. P. A. Harman; F/O. W. E. Hinchcliffe; Sgt. J. A. C. Holmes; P/O. G. McI. Johnston; Sgt. E. E. S. McCulloch; P/O. P. J. A. Magson; Flt. Sgt. L. A. Mallory; Sgt. A. Menzies; Sgt. J. A. Miller; Sgt. F. G. Painter; Sgt. D. H. Pearson; F/O. W. L. Shaw; P/O. J. Williams.

KILLED ON ACTIVE SERVICE.—Sgt. B. E. Bell; Flt. Sgt. F. W. Holcombe; P/O. H. Ibbott; Sgt. J. A. Mawson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Act. Flt. Lt. B. A. MacDonald.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. A. E. Coates; Sgt. E. J. Outen; Sgt. D. S. Proctor; Sgt. J. W. Stuart; P/O. D. J. Tottman.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. B. Moore.

MISSING.—Flt. Sgt. H. S. Shepherd.

South African Air Force

WOUNDED OR INJURED ON ACTIVE SERVICE.—Air Mech. P. R. Searle.

KILLED ON ACTIVE SERVICE.—Air Mech. Q. E. Cullis; Air Mech. L. W. Ackermann.

Casualty Communiqué No. 301

Of the names in this list 132 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—P/O. H. Binns; Sgt. K. R. Buckle; Act. Flt. Lt. E. Carr; Sgt. J. S. Cole; Sgt. T. Gillicker; Sgt. D. V. Jones; Sgt. L. T. C. Maddaford; Sgt. A. L. Mason; Wing Cdr. R. G. Musson; Sgt. T. Rockett; F/O. F. E. Rodda; Sgt. L. L. Sheehan; Sgt. J. H. Simpson; Sgt. E. R. Smith; Sgt. B. Todd; Flt. Sgt. J. S. Walker; Sgt. H. T. Whittlesea.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. E. B. Alsop; Sgt. W. J. Atkinson; F/O. M. W. Baxter; Act. Flt. Sgt. F. V. Brook; Sgt. W. H. Clark; P/O. I. G. A. Faulk; Act. Flt. Lt. E. A. Fletcher; F/O. M. J. Glover; P/O. G. J. Grayland; Sgt. C. C. Hayes; Sgt. D. Heap; Act. Sqn. Ldr. S. G. Hookway, D.F.C.; W/O. C. A. Howard; Sgt. G. H. Kitchen; F/O. E. Luff; F/O. G. F. B. Newport-Tinley, D.F.C.; Sgt. G. Nicholls; Sgt. B. S. Nixon; Sgt. B. M. Pick; Flt. Sgt. R. G. Rowe; Flt. Sgt. H. C. Taylor; F/O. R. D. Turk.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. R. V. Baker; Sgt. R. Babington; Sgt. J. R. Brierley; Sgt. A. J. Chester; F/O. H. A. Clarke; Flt. Sgt. G. A. Coutts; P/O. D. G. de Garis; Sgt. J. Dunne; Sgt. J. R. Ellam; Sgt. R. F. Evans; F/O. W. A. Fowlie; F/O. T. Franks; F/O. H. J. Godfrey; Sgt. E. F. Greenshields; F/O. W. R. Y. Guilfoyle; Sgt. M. Harris; Sgt. A. Jeffreys; Flt. Sgt. R. Johnson; Sgt. A. E. Keeton; Sgt. L. Kelly; F/O. H. Keil; Sgt. A. G. G. McBain; Flt. Sgt. J. R. Mallinson; Sgt. A. McK. Mollison; Sgt. S. J. Newton; Sgt. P. A. Nodes; Sgt. M. J. Norgate; Sgt. D. C. Pennycook; Sgt. H. K. Please; Act. Flt. Lt. K. Powell; F/O. A. G. H. Rouse; F/O. D. H. Smith; Sgt. L. H. Tabner; Flt. Sgt. H. Watts; Sgt. R. S. Williams.

WOUNDED OR INJURED IN ACTION.—Sgt. C. S. Chatten; Sgt. S. A. Gawen; Sgt. J. D. Lillie; Sgt. A. F. Short; Sgt. J. P. Soltau.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. A. E. Arter; F/O. W. E. Bailey; F/O. A. R. Ball; F/O. A. M. Barnard; Sgt. G. J. Broughton; Sgt. J. J. Butler; Sgt. D. A. Cardy; Sgt. H. Chadwick; Sgt. E. G. Cooper; Flt. Sgt. W. Green; Flt. Sgt. D. G. C. Jones; W/O. R. E. Leeper; Sgt. D. McI. Miller; Sgt. C. R. Musson; Act. Flt. Lt. J. Reid; Sgt. E. H. Roden; Sgt. R. J. Small; Sgt. T. A. Wood, P/O. F. Worsnop.

MISSING.—Cpl. K. T. Alexander; Sgt. J. W. Bailey; Act. Flt. Lt. F. B. Birmingham; F/O. A. H. Blazer; Sgt. J. S. Blyth; Sgt. H. Booth; Flt. Sgt. E. F. Bass; P/O. J. M. Brochin; Sgt. J. F. Broadbent; P/O. A. Burns; Sgt. C. Burton; Sgt. W. H. Cade; Sgt. A. Castle; F/O. J. H. Charnock; Sgt. W. B. Clarkson; Act. Flt. Lt. W. L. Covington, D.F.C.; F/O. P. O. Davis; Sgt. F. Dawson; Sgt. F. E. Dudley; Sgt. R. Fidler; Sgt. A. J. Flower; Sgt. A. St. J. Floyd; F/O. S. W. Foster; Sgt. L. Gardner; Sgt. R. K. Garment; Sgt. R. Hadley; Sgt. R. Henshaw; Sgt. C. S. Holter; Sgt. H. F. Hooper; Sgt. F. Jackson; Sgt. J. H. Jenkins; F/O. D. Jimenez; Flt. Lt. H. A. Kidd-May; Sgt. A. W. Kind; P/O. A. V. Kyle; Sgt. J. R. Laing; Flt. Sgt. T. Lancashire; F/O. A. C. Lee; Sgt. W. J. Lee; Sgt. C. J. Lewingdon; P/O. I. R. Lewis; P/O. G. J. McCrae; F/O. W. B. McGinn; Sgt. J. MacKnight; Flt. Sgt. A. S. MacPherson; Act. Flt. Lt. I. F. MacWatt; Sgt. G. C. Major; Flt. Sgt. L. C. Matthews; F/O. P. C. Moxham; Sgt. J. W. Neal; Sgt. P. J. Norreys; Sgt. J. Oxley; P/O. G. B. P. Patterson; Sgt. G. Pettefar; Sgt. J. A. Pitt; Flt. Sgt. S. Powell; Sgt. R. B. Pownall; Sg. J. F. Quickfall; Sgt. R. W. Richardson; Sgt. D. Rushton; Flt. Lt. G. A. Sawtell; Sgt. J. R. Shone; Sgt. H. R. Smith; Sgt. H. R. Snell; Sgt. G. I. Turnbull; Flt. Sgt. T. R. Urquhart; Sgt. E. R. Wallace; Sgt. J. Wardle; Flt. Sgt. A. Whiting; Flt. Sgt. A. C. Wilder; Flt. Sgt. W. S. Williams; Act. Flt. Lt. R. H. Wilson; Sgt. D. A. Woods; Sgt. R. H. Woosnam; F/O. W. H. J. Yeo.

KILLED ON ACTIVE SERVICE.—Sgt. R. B. Armitage; P/O. R. P. T. Akeroyd; Sgt. H. L. H. Bainton; W/O. J. E. Biddle; W/O. F. W. Brands; Flt. Sgt. L. E. Burgess; Sgt. J. T. Chadwick; Sgt. R. S. Deason; Sgt. L. Fraser; Flt. Sgt. E. C. Hainsworth; Sgt. G. W. Hawkes; Sgt. T. S. W. Lawson; Flt. Sgt. H. Nuttridge; Sgt. E. A. Ouster; Sgt. V. H. Pears; Flt. Lt. E. M. Shannon; Flt. Sgt. C. B. Simmons; F/O. MacD. Smith; L.A/C. P. G. C. Smith; L.A/C. L. G. Stone; L.A/C. E. C. F. Vosper; L.A/C. A. H. Witts; Sgt. R. Tattersall; Sgt. H. S. Wheeler.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. D. C. Brooks; Act. Flt. Lt. T. H. Carson, D.F.C.; F/O. F. C. Hill.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. J. Davison; Sgt. D. Dorn; Sgt. R. Egerton; F/O. J. H. Haigh; P/O. G. L. Sellars.

WOUNDED OR INJURED ON ACTIVE SERVICE.—

Sgt. D. B. Evans; Group Capt. S. R. Ubee; Sgt. J. G. Wookey.

DIED ON ACTIVE SERVICE.—L.A/C. A. H. Butterfield; Air Comdre. A. H. Orlebar, C.B.E., A.F.C.; A/C.2 D. A. Prior; A/C.1 A. Smith.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Act. Sqn. Ldr. B. L. Duckenfield, A.F.C.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. J. M. Jeffries; Sgt. R. I. Robb.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. F. Proctor; Flt. Sgt. C. B. Sullivan.

MISSING, BELIEVED KILLED IN ACTION.—P/O. F. A. Preston.

MISSING.—Act. Flt. Lt. E. Dampier-Crossley, D.F.C.; W/O. E. D. Fogden; Flt. Sgt. F. N. Hamood; F/O. J. M. McLean, D.F.C.; P/O. R. J. Ratcliffe; Sgt. A. Scott; Sgt. R. D. C. Smith; F/O. J. C. Valder; Flt. Sgt. W. V. B. Winchester.

KILLED ON ACTIVE SERVICE.—Sgt. J. W. Mudie; F/O. G. F. Wood, D.F.C.,

Royal Canadian Air Force

KILLED IN ACTION.—Act. Flt. Lt. L. H. Burden; Sgt. W. H. Moffat.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. J. F. Barnes; Flt. Sgt. B. M. Chamney; F/O. W. W. H. Cornelius; P/O. J. L. Davidson; Sgt. H. A. Hansen; Flt. Sgt. R. M. Jupe; Sgt. L. E. Kellaway; F/O. J. I. Mackenzie; Flt. Sgt. P. H. Mitchell; Flt. Sgt. H. B. Moore; Flt. Sgt. D. O'Neill; Flt. Sgt. W. O. Powell; Sgt. N. W. Roberts; P/O. G. G. Stanley; Sgt. A. H. Thiessen; Sgt. W. V. Wallace; Sgt. P. F. Yellin.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. H. Davenport; Sgt. R. M. Agnew; Flt. Sgt. F. Beml; Flt. Sgt. T. L. Bentley; Sgt. G. J. Beresford; Flt. Sgt. L. W. Clark; Sgt. J. C. Colter; P/O. J. B. Courtney; P/O. D. E. Crockatt; P/O. C. B. Dixon; Flt. Sgt. D. F. Evans; Sgt. J. B. Frost; Sgt. N. A. Gardner; Sgt. W. E. Hawke; Flt. Sgt. V. C. Hayward; W/O. F. M. Holobow; Flt. Sgt. J. T. Hunt; Sgt. E. H. Ingram; Flt. Sgt. P. King; Sgt. J. F. Kirk; Flt. Sgt. J. L. B. Larin; F/O. C. R. Long; Flt. Sgt. D. W. Lowther; P/O. K. W. MacDonald; P/O. J. R. Marriott; Sgt. G. Mathews; Flt. Sgt. W. McK. Murdoch; Flt. Sgt. D. O'Neill; Sgt. I. A. Penner; Sgt. D. C. Plaunt; Flt. Sgt. R. G. Rispin; P/O. W. W. Roy; Sgt. R. A. P. Sheffield; Flt. Sgt. S. Sleeth; P/O. A. J. Smith; Sgt. J. L. Stordy; Sgt. J. A. J. L. Viau; P/O. W. A. Walkinshaw; Sgt. D. H. Waugh; Sgt. R. S. Woolley.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. C. Green; Sgt. A. A. Hadiken; Sgt. R. R. Keeler; F/O. P. J. McGarvey.

MISSING.—Flt. Sgt. K. R. Bourne; F/O. D. C. W. Clark; P/O. M. Clark; Sgt. E. D. Cornelius; F/O. R. W. Dawe; Sgt. R. R. Kirk; F/O. A. W. Little; F/O. G. S. Low; Sgt. W. R. McLellan; Sgt. B. E. Mitchell; F/O. S. Noble; Sgt. D. S. Phillips; Sgt. J. T. Roach; P/O. L. E. Sibbald; Sgt. R. F. Shortridge; Flt. Sgt. M. Smith; Sgt. W. A. Tennant.

KILLED ON ACTIVE SERVICE.—Flt. Lt. H. C. Bennett; F/O. R. Mendizabel; Sgt. T. W. Pickering.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. D. Loftus; Flt. Sgt. W. R. Parkes; Flt. Sgt. R. W. S. Penny; Sgt. G. H. Rose; Flt. Sgt. E. G. Wilson.

KILLED ON ACTIVE SERVICE.—P/O. B. C. Dreaver.

Casualty Communiqué No. 302.

Of the names in this list, 106 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. P. Lynam; Sgt. F. R. Newman; Flt. Sgt. A. E. Storey.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. G. W. Armer; Sgt. H. G. Bone; Sgt. J. Bradley; Sgt. H. A. Cheasman; Sgt. F. W. Cox; Sgt. D. A. Crofts; F/O. K. H. Ellis; Sgt. A. O. Gilbert; Flt. Sgt. J. L. Hartshorn; Flt. Sgt. H. S. Howland; P/O. D. F. Howlett; Sgt. A. L. Hyrons; Sgt. L. A. Ketley; Sgt. J. W. Kilyon; Sgt. J. G. Lamb; Sgt. F. MacDonald; Sgt. W. A. Martin; Sgt. G. A. Moss; Sgt. R. A. Nunn; Sgt. A. M. Parker; Sgt. W. H. Pritchard; P/O. G. Risch; Act. Flt. Lt. R. E. Richman, D.F.M.; Sgt. A. Sinclair; Flt. Sgt. D. Skinner; Flt. Sgt. A. A. Smith; Sgt. R. E. Stockburn; Flt. Sgt. T. W. Strong; P/O. G. D. R. Thompson; Sgt. J. H. B. Wright.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. H. Arnott; P/O. R. L. Boyes; Sgt. E. A. Brookes; F/O. E. H. Cave-Browne; Sgt. R. L. Chitty; Sgt. S. Coates; Sgt. H. Cowlishaw; Sgt. M. Dransfield; P/O. A. W. Edwards; Sgt. A. J. Ellis; Flt. Sgt. A. R. F. Fortt; Sgt. E. J. Gray; Sgt. R. S. Greep; F/O. W. H. Hoggard; Sgt. L. J. Holleron; Sgt. J. Hughes; Sgt. C. W. James; Sgt. L. G. Jones; Sgt. C. H. Lewis; Sgt. A. D. Lockyer; P/O. D. G. Lovell; Sgt. G. Lyons; Act. Sqn. Ldr. D. A. J. McClure; Sgt. J. MacFarlane; F/O. A. F. MacQueen; Act. Flt. Lt. J. G. A. Maguire; Sgt. R. C. Marston; Flt. Sgt. P. J. Musk; F/O. P. R. V. Myers; F/O. N. J. A. Paton; F/O. E. L. G. Ratcliffe; Sgt. A. Rees; F/O. F. B. Samuel; Sgt. B. Simmons; Sgt. J. W. Simmons; Sgt. D. Thomas; P/O. R. B. F. Walker; P/O. L. E. Warren; Sgt. K. White; Sgt. R. W. White; Flt. Sgt. E. F. Willson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. D. A. H. Underwood.

WOUNDED OR INJURED IN ACTION.—F/O. D. G. Bennett; Sgt. G. H. Coles; Flt. Sgt. W. C. A. Poulter; Flt. Sgt. C. A. Stewart.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. R. H. Bowers.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. T. S. Thomas; Sgt. M. S. Barnard; Sgt. L. F. Jackson; Sgt. E. L. Jones; Sgt. J. R. Luxton; P/O. B. S. McCann; Flt. Sgt. R. G. Muggleton; Sgt. A. C. Samuel; Sgt. P. J. Saunders.

MISSING.—Sgt. W. R. Acland; W/O. H. E. Allen; Sgt. R. F. Avis; P/O. C. P. Backlog; Sgt. J. A. Bacon; W/O. W. C. Baker, D.F.M.; Sgt. D. J. Bigham; F/O. J. W. Brace; Sgt. B. Brear; Flt. Lt. M. C. Bridges; Sgt. R. B. Bull; Flt. Sgt. D. Burke; Sgt. A. L. Butler; Sgt. Ldr. W. R. Butterfield, D.F.C.; Sgt. C. Chadwick; Sgt. L. G. Chesson; Flt. Sgt. E. J. Clinch; Sgt. R. H. Cole; Act W/O. T. Collins; Sgt. K. J. Cork; Sgt. J. A. Currey; Sgt. J. F. Egan; Sgt. D. M. Ellis; Sgt. G. W. Evans; Sgt. P. F. Fairweather; Sgt. D. Fells; Sgt. W. S. Fletton; Sgt. F. J. Gallantree; Sgt. K. E. Goodsell; W/O. H. W. Graham; Sgt. M. Gray; Sgt. D. E. Griffiths; Sgt. M. Griffiths; Sgt. M. S. Grivell; Sgt. P. W. C. Higgs; F/O. F. W. Holland; Flt. Sgt. H. C. Hoyne; F/O. A. B. W. Illius; Sgt. W. B. Jamieson; Sgt. K. Kendal; Sgt. J. G. Knight; Sgt. D. Lamb; Flt. Sgt. V. C. Lewis; Sgt. W. R. Lewis; Act. W/O. J. H. Lowery; P/O. G. W. MacDonald; Sgt. S. J. MacEllenborough; Sgt. T. E. C. K. McKeith; Act. Flt. Lt. A. N. MacPherson, D.F.M.; Act. Sqn. Ldr. M. C. X. Mack; Sgt. D. P. Martin; Sgt. D. M. Mennies; Sgt. F. V. Messenger; Sgt. E. Middleton; Sgt. C. G. R. Moll; Sgt. C. W. Moore; Sgt. G. W. Osmer; Sgt. H. G. Ott; Sgt. N. Pendlebury; Sqn. Ldr. A. P. Philipsen; Sgt. J. H. Phillips; Sgt. R. G. Reay; Sgt. W. M. E. Reid; Sgt. L. Richardson; Sgt. G. A. Ridge; Act. Group Capt. B. V. Robinson, D.S.O., D.F.C., A.F.C.; Sgt. W. H. Robjohns; P/O. E. G. Sheil; Act. Flt. Lt. I. C. B. Slade, D.F.C.; Sgt. D. Smith; Sgt. A. S. Soutar; Sgt. J. W. Standish; Sgt. A. Stansfield; Sgt. M. W. Stevenson; F/O. J. W. Sturdy; Sgt. L. W. Thompson; Flt. Lt. A. M. Todd; Wing Cdr. A. W. T. Traill, D.F.C.; Sgt. J. G. S. Walker; P/O. J. A. Webb; P/O. D. J. Webster; Act. Flt. Lt. H. Webster, D.F.C.; Sgt. P. A. Whitter; Sgt. W. K. Witham; Sqn. Ldr. R. B. Wright.

KILLED ON ACTIVE SERVICE.—Sgt. K. Ashmore; L.A/C. D. V. F. Blindell; Sgt. R. Brown; Sgt. E. W. C. Bryant; Sgt. S. G. Cochrane; Cpl. F. L. Corbishley; Cpl. R. J. Cawley; A/C.2 F. Delaunay; Cpl. E. C. Dodd; Cpl. J. L. Gomm; Sgt. E. S. A. Gray; L.A/C. H. McK. Hall; L.A/C. J. R. Humphries; F/O. H. H. Kirby, D.F.C.; L.A/C. C. Paul; Sgt. F. J. Pellatt; Sgt. F. Powis; Flt. Sgt. A. E. Reynolds; Cpl. W. J. Russell; Sgt. E. J. Sarra; P/O. F. W. Stokes, D.F.C.; L.A/C. D. Tully; L.A/C. S. A. Wakeham; L.A/C. J. R. H. Wilsea; P/O. R. Wingham; Sgt. C. Yates.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. J. Luke.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—W/O. C. M. Browning.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED ON ACTIVE SERVICE.—Sgt. J. Burns.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. G. H. Birkett; L.A/C. A. V. Newill.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—L.A/C. E. Spencer; L.A/C. J. M. Whaley.

DIED ON ACTIVE SERVICE.—F/O. A. V. Amberg; Flt. Lt. H. E. Hayter.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. J. Dawson; Sgt. J. B. Harrison; Sgt. R. M. E. Harrison; Sgt. E. J. Havnar; Sgt. R. Jones; Sgt. M. J. J. Maher; Sgt. M. K. Matthews; Sgt. W. G. Styles.

SERVICE AVIATION

Dinghy drill on a lake at an O.T.U. headquarters. The flotation jackets now carry a small package of greenish-yellow fluorescent dye which makes a patch on the water easily seen from the air.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. N. T. Byrne; Sgt. R. A. Gotts; Flt. Sgt. A. R. Grainger; Flt. Sgt. L. C. Laver; Sgt. B. W. Shearer; Flt. Sgt. D. A. Smith.

MISSING.—P/O. R. J. Adams; Sgt. D. E. Bennington; F/O. I. W. Bowen; Flt. Sgt. N. J. Bullen; Sgt. J. E. Challinor; Sgt. J. R. Dallas; Sgt. J. C. Dwyer; Act. Flt. Lt. N. C. Gerrard; Act. Flt. Lt. H. K. Hornibrook; W/O. F. H. Jones; Flt. Sgt. G. A. G. McLeod; P/O. P. G. Matthews; Sgt. W. E. G. Matthews; Flt. Sgt. R. C. Naffin; Flt. Sgt. L. K. Needs; Flt. Sgt. E. J. Phillips; P/O. S. J. Ricketts, D.F.C.; P/O. J. I. Rowland; F/O. K. D. Smith; Flt. Sgt. D. J. Tresidder; W/O. J. G. H. Webster.

KILLED ON ACTIVE SERVICE.—W/O. A. K. Farlam.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. A. G. Rees.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. C. A. Brennan.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. W. T. Bent; Sgt. D. E. Roberts.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. M. Ben-Hertz; Flt. Lt. J. L. Ellam; Flt. Sgt. E. S. Masson; F/O. A. D. Melville; Sgt. D. R. Ross; Act. Flt. Lt. O. R. Waterbury, D.F.C.; Sgt. A. J. Wilson.

MISSING.—W/O. O. L. Bliss; Sgt. R. C. Brooks; Sgt. J. H. Brown; Flt. Sgt. D. A. J. Cameron; P/O. W. D. Craig; Sgt. D. W. Dulton; Flt. Sgt. A. G. Foster; Sgt. H. J. Hahn; P/O. M. M. McGregor; P/O. W. P. MacD. McIntosh; Sgt. H. S. Martin; P/O. R. W. Nixon; Sgt. C. Robinson; W/O. R. A. Scott; Sgt. C. W. Snyder; Sgt. P. Tomchyshyn; Sgt. T. A. T. Williams.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. D. S. Ross.

Royal New Zealand Air Force

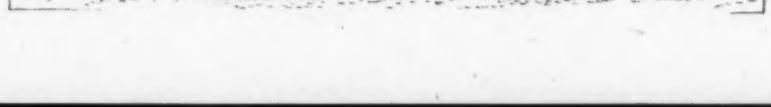
PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. I. Kennedy.

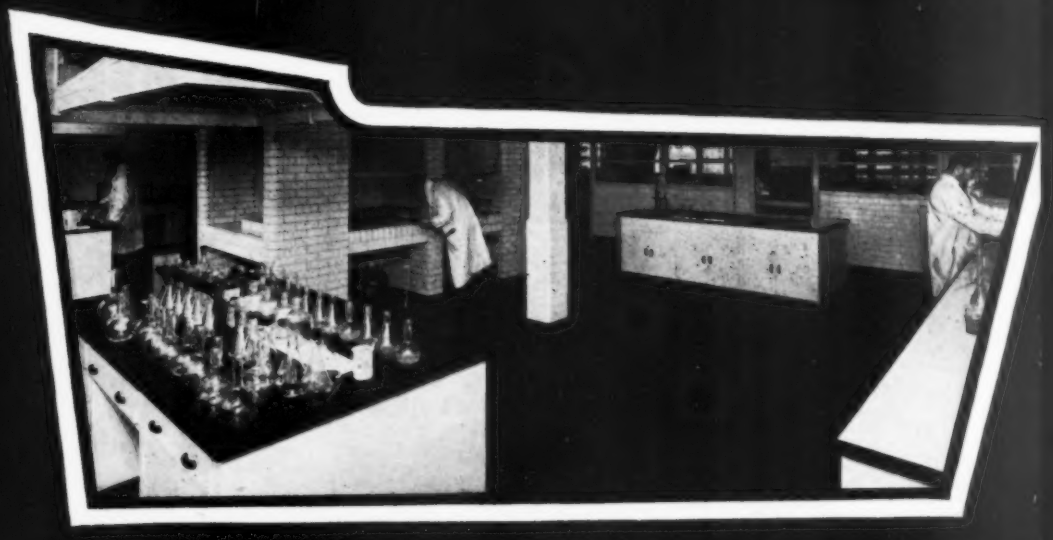
PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. S. I. Gallagher; Sgt. K. J. Johnson; P/O. E. R. Markland; Sgt. R. S. Whitcombe.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. D. G. Aubrey.

MISSING.—Flt. Sgt. A. D. Harris; Flt. Sgt. A. F. Rose.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. W. P. Hermansen.





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Beaufighter

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